Installation Instructions

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Allen-Bradley

# PowerFlex 400 AC Drive Packages for Fan & Pump Applications

## Important User Information

Solid state equipment has operational characteristics differing from those of electromechanical equipment. *Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls* (Publication SGI-1.1 available from your local Rockwell Automation sales office or online at **http://www.rockwellautomation.com/literature**) describes some important differences between solid state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

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Throughout this manual, when necessary we use notes to make you aware of safety considerations.

WARNING: Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.

Important: Identifies information that is critical for successful application and understanding of the product.

ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequences.

**Shock Hazard** labels may be located on or inside the equipment (e.g., drive or motor) to alert people that dangerous voltage may be present.

**Burn Hazard** labels may be located on or inside the equipment (e.g., drive or motor) to alert people that surfaces may be at dangerous temperatures.

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## Manual Updates

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The information below summarizes the changes to the PowerFlex 400 Installation Instructions since the August 2008 release.

### Drawing/Schematic Updates

| Drawing | Page |
|---|---|
| 98D01537 | 1-15 |
| 95D01575 | 1-36 |
| 95D01576 | 1-37 |
| 95D01579 | 1-40 |
| 95D02442 | 1-41 |
| 95D01563 | 1-42 |
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| 95D01552 | 1-67 |
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| 95D01550 | 1-69 |
| 98D01541 | 2-23, 2-24 |
| 98D01539 | 2-25, 2-26 |
| 98D01540 | 2-27, 2-28 |
| 97D00755 | 2-34 |
| 95D01580 | 2-54 |
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### Additional Updates

Replacement Parts listing in Appendix B has been updated.

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# Overview

The purpose of this manual is to provide basic information needed to install, start-up and troubleshoot PowerFlex® 400 Adjustable Frequency AC Drive Packages for Fan & Pump Applications.

User documentation for the PowerFlex 400 Drive Packages for Fan & Pump Applications includes these Installation Instructions and the PowerFlex 400 User Manual, Publication 22C-UM001…. Both manuals are required to properly install and operate the PowerFlex 400 Adjustable Frequency AC Drive Packages for Fan & Pump Applications.


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## Who Should Use this Manual?

This manual is intended for qualified personnel. You must be able to program and operate Adjustable Frequency AC Drive devices. In addition, you must have an understanding of the parameter settings and functions.

## What Is Not in this Manual

The PowerFlex 400 Adjustable Frequency AC Drive Packages for Fan & Pump Applications Installation Instructions is designed to provide only basic installation and operation information. For this reason, the following topics have not been included:

- Specifications
- Troubleshooting
- Start-Up
- Programming and Parameters

Please refer to the PowerFlex 400 User Manual for detailed drive information.

## Reference Materials

The following manuals are recommended for general drive information:

| Title | Publication | Available Online at ... |
|---|---|---|
| Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drives | DRIVES-IN001... | **www.rockwellautomation.com /literature** |
| Preventive Maintenance of Industrial Control and Drive System Equipment | DRIVES-TD001... | |
| Safety Guidelines for the Application, Installation and Maintenance of Solid State Control | SGI-1.1 | |
| A Global Reference Guide for Reading Schematic Diagrams | 0100-2.10 | |
| Guarding Against Electrostatic Damage | 8000-4.5.2 | |

For detailed PowerFlex 400 information including drive parameters, programming, start-up, troubleshooting, specifications:

| Title | Publication | Available Online at ... |
|---|---|---|
| PowerFlex 400 User Manual | 22C-UM001... | **www.rockwellautomation.com/literature** |
| PowerFlex Reference Manual | PFLEX-RM001... | |

For Allen-Bradley Drives Technical Support:

| Title | Online at ... |
|---|---|
| Allen-Bradley Drives Technical Support | **www.ab.com/support/abdrives** |

## Manual Conventions

- To help differentiate parameter names and LCD display text from other text, the following conventions will be used:
  - Parameter Names will appear in [brackets].
    For example: [DC Bus Voltage].
  - Display Text will appear in “quotes.” For example: “Enabled.”
- The following words are used throughout the manual to describe an action:

| Word | Meaning |
|---|---|
| Can | Possible, able to do something |
| Cannot | Not possible, not able to do something |
| May | Permitted, allowed |
| Must | Unavoidable, you must do this |
| Shall | Required and necessary |
| Should | Recommended |
| Should Not | Not recommended |

## General Precautions

**ATTENTION:** This drive contains ESD (Electrostatic Discharge) sensitive parts and assemblies. Static control precautions are required when installing, testing, servicing or repairing this assembly. Component damage may result if ESD control procedures are not followed. If you are not familiar with static control procedures, reference A-B publication 8000-4.5.2, "Guarding Against Electrostatic Damage" or any other applicable ESD protection handbook.

**ATTENTION:** An incorrectly applied or installed drive can result in component damage or a reduction in product life. Wiring or application errors, such as, undersizing the motor, incorrect or inadequate AC supply, or excessive ambient temperatures may result in malfunction of the system.

**ATTENTION:** Only qualified personnel familiar with adjustable frequency AC drives and associated machinery should plan or implement the installation, start-up and subsequent maintenance of the system. Failure to comply may result in personal injury and/or equipment damage.

**ATTENTION:** To avoid an electric shock hazard, verify that the voltage on the bus capacitors has discharged before performing any work on the drive. Measure the voltage at the drive (Refer to the PowerFlex 400 User Manual for test point locations). The voltage must be zero.

## Catalog Number Explanation

The PowerFlex 400 Adjustable Frequency AC Drive Packages for Fan & Pump Applications catalog numbering scheme is shown below.

Position

| 1-3 | 4 | 5 | 6-8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 23C | – | D | 038 | A | 1 | 0 | 3 | N | N | B | A | N | N | -LR |
| a | | b | c | d | e | f | g | h | i | j | k | l | m | n |

### a

| Drive | |
|---|---|
| Code | Type |
| 23C | PowerFlex 400 |

### b

| Voltage Rating | | |
|---|---|---|
| Code | Voltage | Ph. |
| X | 208V ac | 3 |
| D | 480V ac | 3 |

### c1

| Rating | | | |
|---|---|---|---|
| 208V, 60Hz Input | | | |
| Code | Amps ∗ | kW (Hp) | Frame |
| 012 | 12 | 2.2 (3.0) | C |
| 017 | 16.8 | 3.7 (5.0) | C |
| 024 | 24 | 5.5 (7.5) | C |
| 033 | 30.8 | 7.5 (10) | C |
| 049 | 46.2 | 11 (15) | D |
| 065 | 64 | 15 (20) | D |
| 075 | 75 | 18.5 (25) | D |
| 090 | 88 | 22 (30) | D |
| 120 | 114 | 30 (40) | E |
| 145 | 143 | 37 (50) | E |

∗ Configured drive amp ratings may differ from stand-alone drive ratings. Configured drives sized per NEC motor amps.

### c2

| Rating | | | |
|---|---|---|---|
| 460V, 60Hz Input | | | |
| Code | Amps ∗ | kW (Hp) | Frame |
| 6P0 | 4.8 | 2.2 (3.0) | C |
| 010 | 7.6 | 4.0 (5.0) | C |
| 012 | 11 | 5.5 (7.5) | C |
| 017 | 14 | 7.5 (10) | C |
| 022 | 21 | 11 (15) | C |
| 030 | 27 | 15 (20) | C |
| 038 | 34 | 18.5 (25) | D |
| 045 | 40 | 22 (30) | D |
| 060 | 52 | 30 (40) | D |
| 072 | 65 | 37 (50) | E |
| 088 | 77 | 45 (60) | E |
| 105 | 96 | 55 (75) | E |
| 142 | 124 | 75 (100) | E |
| 170 | 156 | 90 (125) | F |
| 208 | 180 | 110 (150) | F |
| 260 | 240 | 132 (200) | G |
| 310 | 302 | 160 (250) | G |
| 370 | 361 | 200 (300) | H |
| 460 | 414 | 250 (350) | H |

∗ Configured amp ratings may differ from stand-alone drive ratings. Configured drives sized per NEC motor amps.

### d

| Enclosure | |
|---|---|
| Code | Enclosure |
| A | NEMA/UL Type 1 |
| H | NEMA/UL Type 12 with Fan and Filter |
| X | NEMA/UL Type 3R ‡ |
| E | NEMA/UL Type 4 ‡ |

‡ Designed for maximum ambient temperature of 40° C with no direct sunlight exposure.

### e

| HIM | |
|---|---|
| Code | Interface Module |
| 1 | Fixed Keypad |

### f

| Emission Class | |
|---|---|
| Code | Rating |
| 0 | Not Filtered |

### g

| Version | |
|---|---|
| Code | Version |
| 3 | RS485 |
| B | BACnet Adapter |
| C | ControlNet Adapter |
| D | DeviceNet Adapter |
| E | EtherNet/IP Adapter |
| L | LonWorks Adapter |
| P | PROFIBUS DP Adapter |

### h

| Code | Rating |
|---|---|
| N | Reserved |

### i

| Code | Rating |
|---|---|
| N | Reserved |

### j

| Package | |
|---|---|
| Code | Description |
| A | Main Input Disconnect |
| B | 3 Contactor Full Feature Bypass with Disconnect |
| C | 3 Contactor Basic Bypass with Disconnect ➢ |
| M | Main Input Circuit Breaker ❄ |
| N | 3 Contactor Full Feature Bypass with Circuit Breaker ❄ |

➢ Available only with NEMA/UL Type 1 enclosure (Position d = A).

❄ Available with all ratings in NEMA/UL Type 12, 3R, or 4 enclosures (Position d = H, X, or E) and 160-250 kW (250-350 Hp) ratings in NEMA/UL Type 1 enclosures (Position d = A).

### k

| Control | |
|---|---|
| Code | Description |
| A | Single Motor |

### l

| Code | Rating |
|---|---|
| N | Reserved |

### m

| Code | Rating |
|---|---|
| N | Reserved |

### n

| Options | |
|---|---|
| Code | Description |
| -LR | 3% Input Line Reactor § |
| -E5 | Space Heater - Local Power ♣ |

§ 3% Input Line Reactor not available for all package styles. Consult product selection tables for additional detail.

♣ Available with NEMA/UL Type 3R and 4 enclosures only.

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# Main Input Disconnect Package (Style A/M)

## Style Explanation

- Style A = Fused Disconnect
- Style M = Circuit Breaker

## Chapter Objectives

This chapter describes the features and operation for the Main Input Disconnect Package (Style A/M).


| For information on ... | See page ... |
|---|---|
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## Hardware Overview

The Main Input Disconnect Package (Style A/M) combines an Adjustable Frequency AC Drive with a means for disconnecting input power within a single package. Input power is connected to the PowerFlex drive through a door interlocked fuse disconnect switch or circuit breaker.

### Main Disconnect Switch (DS1)

An Allen-Bradley Bulletin 194R Fused Disconnect Switch with lockable rotary mounted operator handle is provided. The disconnect switch is designed to meet disconnect switch requirements for branch circuit protection. The door mounted handle accepts up to three (3) padlocks.

### Main Circuit Breakers (CB1)

An Allen-Bradley Bulletin 140U circuit breaker with lockable rotary mounted operator handle is provided. The circuit breaker is designed to meet circuit breaker requirements for branch circuit protection. The door-mounted handle accepts up to three (3) padlocks.

## Main Fuses (FU1-FU3)

**ATTENTION:** Most codes require that upstream branch circuit protection be provided to protect input power wiring. Install the fuses recommended in Table 1.A. Do not exceed the fuse ratings. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

Input line branch circuit protection fuses must be used to protect the input power lines. If input fuses are not provided with your drive, recommended fuse values are shown in Table 1.A. The input fuse ratings listed in Table 1.A are applicable for one drive per branch circuit. No other load may be applied to that fused circuit.

The recommended fuse type for all PowerFlex 400 Drive Packages for Fan & Pump Applications is UL Class J.

**Table 1.A Fuse Recommendations**

| Drive Rating | | | Fuse Rating |
|---|---|---|---|
| Input Voltage | kW | Hp | Amps |
| 208V AC – 3-Phase | 2.2 | 3.0 | 20 |
| | 3.7 | 5.0 | 20 |
| | 5.5 | 7.5 | 35 |
| | 7.5 | 10 | 40 |
| | 11 | 15 | 80 |
| | 15 | 20 | 100 |
| | 18.5 | 25 | 125 |
| | 22 | 30 | 150 |
| | 30 | 40 | 200 |
| | 37 | 50 | 250 |
| 460V AC – 3-Phase | 2.2 | 3.0 | 10 |
| | 4.0 | 5.0 | 15 |
| | 5.5 | 7.5 | 20 |
| | 7.5 | 10 | 20 |
| | 11 | 15 | 35 |
| | 15 | 20 | 35 |
| | 18.5 | 25 | 60 |
| | 22 | 30 | 70 |
| | 30 | 40 | 80 |
| | 37 | 50 | 100 |
| | 45 | 60 | 150 |
| | 55 | 75 | 175 |
| | 75 | 100 | 200 |
| | 90 | 125 | 250 |
| | 110 | 150 | 350 |
| | 132 | 200 | 400 |
| | 160 | 250 | 500 |
| | 200 | 300 | 600 |
| | 250 | 350 | 700 |

## Electrical Installation

### Input Power Wiring

Use 75 °C rated copper conductors only for customer power wiring.

Refer to the PowerFlex 400 User Manual for additional detailed information about input power wiring recommendations and selection.

**ATTENTION:** Protect the contents of the options cabinet from metal chips and other debris while drilling the conduit openings. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

**ATTENTION:** Do not route signal and control wiring with power wiring in the same conduit. This can cause interference with drive operation. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

To connect AC input power to the drive package:

❑ **1.** Select the proper wire size according to NEC and all applicable local codes and standards. Note that you must punch openings in the Option Cabinet of the desired conduit size, following NEC and all applicable local codes and standards. Power terminal block specifications are listed in Table 1.B.

❑ **2.** Connect the three-phase AC input power leads (three-wire VAC) to the appropriate terminals. Connect the AC input power leads to terminals L1, L2, L3 on the fused disconnect switch.

❑ **3.** Tighten the AC input terminal power terminals to the proper torque according to drive type as shown in Table 1.B.

**Table 1.B AC Input Power Terminal Block Specifications**

| Volts AC | kW | Hp | Maximum Wire Size(1) | Minimum Wire Size | Recommended Torque |
|---|---|---|---|---|---|
| 208V | 2.2...3.7 | 3.0...5.0 | 8.4 mm$^2$ (8 AWG) | 2.5 mm$^2$ (14 AWG) | 4.0 N•m (35 lb•in) |
| | 5.5...7.5 | 7.5...10 | 16.0 mm$^2$ (4 AWG) | 2.5 mm$^2$ (14 AWG) | 4.0 N•m (35 lb•in) |
| | 11...15 | 15...20 | 33.6 mm$^2$ (2 AWG) | 2.5 mm$^2$ (14 AWG) | 17.5 N•m (155 lb•in) |
| | 18.5...30 | 25...40 | 250 MCM | 10.0 mm$^2$ (6 AWG) | 31.1 N•m (275 lb•in) |
| | 37 | 50 | 350 MCM | 35.0 mm$^2$ (1/0 AWG) | 31.1 N•m (275 lb•in) |
| 460V | 2.2...7.5 | 3.0...10 | 8.4 mm$^2$ (8 AWG) | 2.5 mm$^2$ (14 AWG) | 4.0 N•m (35 lb•in) |
| | 11...18.5 | 15...25 | 16.0 mm$^2$ (4 AWG) | 2.5 mm$^2$ (14 AWG) | 4.0 N•m (35 lb•in) |
| | 22...37 | 30...50 | 33.6 mm$^2$ (2 AWG) | 2.5 mm$^2$ (14 AWG) | 17.5 N•m (155 lb•in) |
| | 45...75 | 60...100 | 250 MCM | 10.0 mm$^2$ (6 AWG) | 31.1 N•m (275 lb•in) |
| | 90...110 | 125...150 | (2) 350 MCM | (2) 10.0 mm$^2$ (6 AWG) | 31.1 N•m (275 lb•in) |
| | 132 | 200 | (2) 350 MCM | (2) 35.0 mm$^2$ (1/0 AWG) | 31.1 N•m (275 lb•in) |
| | 160...200 | 250...300 | (2) 350 MCM | (2) 70.0 mm$^2$ (3/0 AWG) | 31.1 N•m (275 lb•in) |
| | 250 | 350 | (2) 400 MCM | (2) 70.0 mm$^2$ (3/0 AWG) | 31.1 N•m (275 lb•in) |

(1) Maximum/minimum sizes that the terminal block will accept - these are not recommendations. If national or local codes require sizes outside the range, lugs may be used.

## Output Power Wiring

Refer to the PowerFlex 400 User Manual for additional detailed information about output power wiring recommendations and selection.

**ATTENTION:** Unused wires in conduit must be grounded at both ends to avoid a possible shock hazard caused by induced voltages. Also, if a drive sharing a conduit is being serviced or installed, all drives using this conduit should be disabled to eliminate the possible shock hazard from cross-coupled motor leads. Failure to observe these precautions could result in bodily injury.

**ATTENTION:** Do not route signal and control wiring with power wiring in the same conduit. This can cause interference with drive operation. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

To connect AC output power wiring from the drive to the motor:

❑ **1.** Wire the three-phase AC output power motor leads by routing them according to the drive option type. Note that you must punch openings in the option cabinet of the desired conduit size, following NEC and all applicable local codes and standards. Power terminal block specifications are listed in Table 1.C.

Do not route more than three sets of motor leads through a single conduit. This will minimize cross-talk that could reduce the effectiveness of noise reduction methods. If more than three drive/motor connections per conduit are required, shielded cable must be used. If possible, each conduit should contain only one set of motor leads.

❑ **2.** Connect the three-phase AC output power motor leads to terminals U, V, W (T1, T2, T3) on the power terminal block located on the drive.

❑ **3.** Tighten the three-phase AC output power terminals to the proper torque according to drive type as shown in Table 1.C.

**Table 1.C AC Output Power Terminal Block Specifications**

| Volts AC | kW | Hp | Maximum Wire Size(1) | Minimum Wire Size | Recommended Torque |
|---|---|---|---|---|---|
| 208V | 2.2...7.5 | 3.0...10 | 8.4 mm$^2$ (8 AWG) | 1.3 mm$^2$ (16 AWG) | 3.7 N•m (33 lb•in) |
| | 11...22 | 15...30 | 33.6 mm$^2$ (2 AWG) | 8.4 mm$^2$ (8 AWG) | 5.1 N•m (45 lb•in) |
| | 30...37 | 40...50 | 33.6 mm$^2$ (2 AWG) | 2.5 mm$^2$ (14 AWG) | 17.5 N•m (155 lb•in) |
| 460V | 2.2...15 | 3.0...20 | 8.4 mm$^2$ (8 AWG) | 1.3 mm$^2$ (16 AWG) | 3.7 N•m (33 lb•in) |
| | 18.5...30 | 25...40 | 33.6 mm$^2$ (2 AWG) | 8.4 mm$^2$ (8 AWG) | 5.1 N•m (45 lb•in) |
| | 37...45 | 50...60 | 33.6 mm$^2$ (2 AWG) | 3.5 mm$^2$ (12 AWG) | 5.6 N•m (49.5 lb•in) |
| | 55...75 | 75...100 | 107.2 mm$^2$ (4/0 AWG) | 53.5 mm$^2$ (1/0 AWG) | 19.5 N•m (173 lb•in) |
| | 90...110 | 125...150 | 300 MCM | 70.0 mm$^2$ (3/0 AWG) | 19.5 N•m (173 lb•in) |
| | 132...160 | 200...250 | 300 MCM | 107.2 mm$^2$ (4/0 AWG) | 29.4 N•m (260 lb•in) |
| | 200...250 | 300...350 | 500 MCM | 300 MCM | 40.0 N•m (354 lb•in) |

(1) Maximum/minimum sizes that the terminal block will accept - these are not recommendations. If national or local codes require sizes outside the range, lugs may be used.

## Control and Signal Wiring

Refer to the PowerFlex 400 User Manual for additional detailed information about control and signal wiring.

The Control I/O Terminal Block (TB1) and Relay Terminal Block (TB2) located on the drive Main Control Board provide terminals for interfacing customer supplied control inputs and outputs. All analog and discrete control wiring will be made at these terminals. Typical customer control and signal wiring is shown on the Interconnect Drawings Figure 1.8 and Figure 1.9.

To connect control and signal wiring to the drive package:

❑ **1.** Wire the control and signal leads by routing them according to the drive option type. Note that you must punch openings in the option cabinet of the desired conduit size, following NEC and all applicable local codes and standards. I/O terminal block specifications are listed in Table 1.D.

Control and signal wires should be separated from power wires by at least 0.3 meters (1 foot).

❑ **2.** Connect the control and signal wiring to the I/O terminals located on the drive.

❑ **3.** Tighten the I/O terminals to the proper torque according to drive type as shown in Table 1.D.

**Table 1.D I/O Terminal Block Specifications**

| Voltage Rating | Maximum Wire Size(1) | Minimum Wire Size | Torque |
|---|---|---|---|
| 208…460V AC | 1.3 $mm^2$ (16 AWG) | 0.13 $mm^2$ (26 AWG) | 0.5…0.8 N•m (4.4…7 lb•in) |

(1) Maximum/minimum sizes that the terminal block will accept - these are not recommendations.

# Parameter Defaults Main Input Disconnect Package (Style A/M)

| Parameter Name | Number | Default |
|---|---|---|
| Output Freq | b001 | Read Only |
| Commanded Freq | b002 | Read Only |
| Output Current | b003 | Read Only |
| Output Voltage | b004 | Read Only |
| DC Bus Voltage | b005 | Read Only |
| Drive Status | b006 | Read Only |
| Fault 1 Code | b007 | Read Only |
| Process Display | b008 | Read Only |
| Output Power | b010 | Read Only |
| Elapsed MWh | b011 | Read Only |
| Elapsed Run Time | b012 | Read Only |
| Torque Current | b013 | Read Only |
| Drive Temp | b014 | Read Only |
| Elapsed kWh | b015 | Read Only |
| | | |
| Motor NP Volts | P031 | Drive Rated Volts |
| Motor NP Hertz | P032 | 60 Hz |
| Motor OL Current | P033 | Drive Rated Amps |
| Minimum Freq | P034 | 0.0 Hz |
| Maximum Freq | P035 | 60 Hz |
| Start Source | P036 | 6 "2-W Lvl/Enbl" (1) |
| Stop Mode | P037 | 1 "Coast, CF" |
| Speed Reference | P038 | 2 "Analog In1" |
| Accel Time 1 | P039 | 20.00 Secs |
| Decel Time 1 | P040 | 20.00 Secs |
| Reset To Defalts | P041 | 0 "Ready/Idle" |
| Auto Mode | P042 | 1 "Hnd-Off-Auto" |
| | | |
| Digital In1 Sel | T051 | 1 "Purge" |
| Digital In2 Sel | T052 | 3 "Local" |
| Digital In3 Sel | T053 | 10 "Clear Fault" |
| Digital In4 Sel | T054 | 4 "Comm Port" |
| Relay Out1 Sel | T055 | 0 "Ready/Fault" |
| Relay Out1 Level | T056 | 0.0 |
| Relay 1 On Time | T058 | 0.0 Secs |
| Relay 1 Off Time | T059 | 0.0 Secs |
| Relay Out2 Sel | T060 | 2 "MotorRunning" |
| Relay Out2 Level | T061 | 0.0 |
| Relay 2 On Time | T063 | 0.0 Secs |
| Relay 2 Off Time | T064 | 0.0 Secs |
| Opto Out Sel | T065 | 1 "At Frequency" |
| Opto Out Level | T066 | 0.0 |
| Opto Out Logic | T068 | 0 "Normally Open" |
| Analog In 1 Sel | T069 | 2 "0-10V" |
| Analog In 1 Lo | T070 | 0.0% |
| Analog In 1 Hi | T071 | 100.0% |
| Analog In 1 Loss | T072 | 0 "Disabled" |
| Analog In 2 Sel | T073 | 1 "4-20 mA" (1) |
| Analog In 2 Lo | T074 | 0.0% |
| Analog In 2 Hi | T075 | 100.0% |
| Analog In 2 Loss | T076 | 0 "Disabled" |
| Sleep-Wake Sel | T077 | 0 "Disabled" |
| Sleep Level | T078 | 10.0% |
| Sleep Time | T079 | 0.0 Secs |
| Wake Level | T080 | 15.0% |
| Wake Time | T081 | 0.0 Secs |
| Analog Out1 Sel | T082 | 0 "OutFreq 0-10" |
| Analog Out1 High | T083 | 100% |
| Analog Out1 Setpt | T084 | 0.0% |
| Analog Out2 Sel | T085 | 1 "OutCurr 0-10" |
| Analog Out2 High | T086 | 100% |
| Analog Out2 Setpt | T087 | 0.0% |
| | | |
| Language | C101 | 1 "English" |
| Comm Format | C102 | 0 "RTU 8-N-1" |
| Comm Data Rate | C103 | 3 "9600" |
| Comm Node Addr | C104 | 100 |
| Comm Loss Action | C105 | 0 "Fault" |
| Comm Loss Time | C106 | 5.0 Secs |
| Comm Write Mode | C107 | 0 "Save" |
| | | |
| Purge Frequency | A141 | 5.0 Hz |
| Internal Freq | A142 | 60.00 Hz |
| Preset Freq 0 | A143 | 0.0 Hz |
| Preset Freq 1 | A144 | 5.0 Hz |
| Preset Freq 2 | A145 | 10.0 Hz |
| Preset Freq 3 | A146 | 20.0 Hz |
| Accel Time 2 | A147 | 30.00 Secs |
| Decel Time 2 | A148 | 30.00 Secs |
| S Curve % | A149 | 20% |
| PID Trim Hi | A150 | 60.0 Hz |
| PID Trim Lo | A151 | 0.0 Hz |
| PID Ref Sel | A152 | 0 "PID Disabled" |
| PID Feedback Sel | A153 | 0 "Analog In 1" |
| PID Prop Gain | A154 | 0.01 |
| PID Integ Time | A155 | 2.0 Secs |
| PID Diff Rate | A156 | 0.00 |
| PID Setpoint | A157 | 0.0% |
| PID Deadband | A158 | 0.0% |
| PID Preload | A159 | 0.0 Hz |
| Process Factor | A160 | 30.0 |
| Auto Rstrt Tries | A163 | 0 |
| Auto Rstrt Delay | A164 | 1.0 Secs |
| Start At PowerUp | A165 | 1 "Enabled" (1) |
| Reverse Disable | A166 | 1 "Rev Disabled" |
| Flying Start En | A167 | 1 "Enabled" (1) |
| PWM Frequency | A168 | 4.0 kHz |
| PWM Mode | A169 | 1 "2-Phase" |
| Boost Select | A170 | 4 "45.0, VT" |
| Start Boost | A171 | 2.5% |
| Break Voltage | A172 | 25.0% |
| Break Frequency | A173 | 15.0 Hz |
| Maximum Voltage | A174 | Drive Rated Volts |
| Slip Hertz @ FLA | A175 | 2.0 Hz |
| DC Brake Time | A176 | 0.0 Secs |
| DC Brake Level | A177 | Drive Rated Amps |
| DC Brk Time@Strt | A178 | 0 (Disabled) |
| Current Limit 1 | A179 | Drive Rated Amps |
| Current Limit 2 | A180 | Drive Rated Amps |
| Motor OL Select | A181 | 0 "No Derate" |
| Drive OL Mode | A182 | 3 "Both-PWM 1st" |
| SW Current Trip | A183 | 0.0 (Disabled) |
| Load Loss Level | A184 | 0.0 (Disabled) |
| Load Loss Time | A185 | 0 Secs |
| Stall Fault Time | A186 | 0 "60 Seconds" |
| Bus Reg Mode | A187 | 1 "Enabled" |
| Skip Frequency 1 | A188 | 0 Hz |
| Skip Freq Band 1 | A189 | 0.0 Hz |
| Skip Frequency 2 | A190 | 0 Hz |
| Skip Freq Band 2 | A191 | 0.0 Hz |
| Skip Frequency 3 | A192 | 0 Hz |
| Skip Freq Band 3 | A193 | 0.0 Hz |
| Compensation | A194 | 1 "Electrical" |
| Reset Meters | A195 | 0 "Ready/Idle" |
| Testpoint Sel | A196 | 400 |
| Fault Clear | A197 | 0 "Ready/Idle" |
| Program Lock | A198 | 0 "Unlocked" |
| Motor NP Poles | A199 | 4 |
| | | |
| Relay Out3 Sel | R221 | 0 "Ready/Fault" |
| Relay Out3 Level | R222 | 0.0 |
| Relay Out4 Sel | R224 | 0 "Ready/Fault" |
| Relay Out4 Level | R225 | 0.0 |
| Relay Out5 Sel | R227 | 0 "Ready/Fault" |
| Relay Out5 Level | R228 | 0.0 |
| Relay Out6 Sel | R230 | 0 "Ready/Fault" |
| Relay Out6 Level | R231 | 0.0 |
| Relay Out7 Sel | R233 | 0 "Ready/Fault" |
| Relay Out7 Level | R234 | 0.0 |
| Relay Out8 Sel | R236 | 0 "Ready/Fault" |
| Relay Out8 Level | R237 | 0.0 |
| Aux Motor Mode | R239 | 0 "Disabled" |
| Aux Motor Qty | R240 | 1 "1 Aux Mtr" |
| Aux 1 Start Freq | R241 | 50.0 Hz |
| Aux 1 Stop Freq | R242 | 25.0 Hz |
| Aux 1 Ref Add | R243 | 0.0% |
| Aux 2 Start Freq | R244 | 50.0 Hz |
| Aux 2 Stop Freq | R245 | 25.0 Hz |
| Aux 2 Ref Add | R246 | 0.0% |
| Aux 3 Start Freq | R247 | 50.0 Hz |
| Aux 3 Stop Freq | R248 | 25.0 Hz |
| Aux 3 Ref Add | R249 | 0.0% |
| Aux Start Delay | R250 | 5.0 Secs |
| Aux Stop Delay | R251 | 3.0 Secs |
| Aux Prog Delay | R252 | 0.50 Secs |
| Aux AutoSwap Tme | R253 | 0.0 Hr |
| Aux AutoSwap Lvl | R254 | 50.0% |
| | | |
| Control Source | d301 | Read Only |
| Contrl In Status | d302 | Read Only |
| Comm Status | d303 | Read Only |
| PID Setpnt Displ | d304 | Read Only |
| Analog In 1 | d305 | Read Only |
| Analog In 2 | d306 | Read Only |
| Fault 1 Code | d307 | Read Only |
| Fault 2 Code | d308 | Read Only |
| Fault 3 Code | d309 | Read Only |
| Fault 1 Time-hr | d310 | Read Only |
| Fault 1 Time-min | d311 | Read Only |
| Fault 2 Time-hr | d312 | Read Only |
| Fault 2 Time-min | d313 | Read Only |
| Fault 3 Time-hr | d314 | Read Only |
| Fault 3 Time-min | d315 | Read Only |
| Elapsed Time-hr | d316 | Read Only |
| Elapsed Time-min | d317 | Read Only |
| Output Powr Fctr | d318 | Read Only |
| Testpoint Data | d319 | Read Only |
| Control SW Ver | d320 | Read Only |
| Drive Type | d321 | Read Only |
| Output Speed | d322 | Read Only |
| Output RPM | d323 | Read Only |
| Fault Frequency | d324 | Read Only |
| Fault Current | d325 | Read Only |
| Fault Bus Volts | d326 | Read Only |
| Status @ Fault | d327 | Read Only |

(1) The default values of these parameters differ from Factory Defaults. Setting P041 [Reset To Defalts] to 1 "Factory Rset" will change these parameter settings to the defaults list in the PowerFlex 400 User Manual.

**ATTENTION:** Parameter A165 [Start At PowerUp] ships from the factory enabled. This feature allows a Run command to automatically cause the drive to resume running at commanded speed after drive input power is restored. Equipment damage and/or personal injury may result if this parameter is used in an inappropriate application. Do not use this function without considering applicable local, national and international codes, standards, regulations or industry guidelines.

## Drawing Index

## 208V AC – Main Input Disconnect Drive Packages (Style A/M)

| Input Voltage | Type | Hp | Input Line Reactor | Drawing Schematic | Page | interconnect | Page | Layout | Page | Outline | Page | Hp |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 208V AC | NEMA/UL Type 1 | 3 | No | 98D00697 | 1-10 | 97D00696 | 1-17 | 95D00758 | 1-22 | 95D00689 | 1-53 | 3 |
| | | 5 | | | | | | | | | | 5 |
| | | 7.5 | | | | | | | | | | 7.5 |
| | | 10 | | | | | | | | | | 10 |
| | | 15 | | | | | | 95D00759 | 1-23 | 95D00691 | 1-54 | 15 |
| | | 20 | | | | | | | | | | 20 |
| | | 25 | | | | | | 95D00775 | 1-24 | 95D00692 | 1-55 | 25 |
| | | 30 | | | | | | | | | | 30 |
| | | 40 | | | | | | 95D00760 | 1-25 | 95D00693 | 1-56 | 40 |
| | | 50 | | | | | | 95D00776 | 1-26 | 95D00694 | 1-57 | 50 |
| | | 3 | Yes | 98D00756 | 1-11 | 97D00754 | 1-18 | 95D00791 | 1-30 | 95D00690 | 1-61 | 3 |
| | | 5 | | | | | | | | | | 5 |
| | | 7.5 | | | | | | 95D00792 | 1-31 | 95D00753 | 1-62 | 7.5 |
| | | 10 | | | | | | | | | | 10 |
| | | 15 | | | | | | 95D01367 | 1-32 | 95D01359 | 1-63 | 15 |
| | | 20 | | | | | | | | | | 20 |
| | | 25 | | | | | | 95D01368 | 1-33 | 95D01360 | 1-64 | 25 |
| | | 30 | | | | | | | | | | 30 |
| | | 40 | | | | | | 95D01369 | 1-34 | 95D01361 | 1-65 | 40 |
| | | 50 | | | | | | | | | | 50 |
| | NEMA/UL Type 12 | 3 | With or Without | 98D01535 | 1-14 | 97D01548 | 1-21 | 95D01575 | 1-36 | 95D01552 | 1-67 | 3 |
| | | 5 | | | | | | | | | | 5 |
| | | 7.5 | | | | | | | | | | 7.5 |
| | | 10 | | | | | | | | | | 10 |
| | | 15 | | | | | | 95D01576 | 1-37 | | | 15 |
| | | 20 | | | | | | | | | | 20 |
| | | 25 | | | | | | | | | | 25 |
| | | 30 | | | | | | | | | | 30 |
| | | 40 | | | | | | 95D01578 | 1-39 | | | 40 |
| | | 50 | | | | | | | | | | 50 |
| | NEMA/UL Type 4 | 3 | With or Without | 98D01537 | 1-15 | 97D01548 | 1-21 | 95D01563 | 1-42 | 95D01551 | 1-68 | 3 |
| | | 5 | | | | | | | | | | 5 |
| | | 7.5 | | | | | | | | | | 7.5 |
| | | 10 | | | | | | | | | | 10 |
| | | 15 | | | | | | 95D01564 | 1-43 | | | 15 |
| | | 20 | | | | | | 95D01565 | 1-44 | | | 20 |
| | | 25 | | | | | | 95D01566 | 1-45 | | | 25 |
| | | 30 | | | | | | | | | | 30 |
| | | 40 | | | | | | 95D01567 | 1-46 | | | 40 |
| | | 50 | | | | | | | | | | 50 |
| | NEMA/UL Type 3R | 3 | With or Without | 98D01535 | 1-14 | 97D01548 | 1-21 | 95D01553 | 1-48 | 95D01550 | 1-69 | 3 |
| | | 5 | | | | | | | | | | 5 |
| | | 7.5 | | | | | | | | | | 7.5 |
| | | 10 | | | | | | | | | | 10 |
| | | 15 | | | | | | 95D01554 | 1-49 | | | 15 |
| | | 20 | | | | | | | | | | 20 |
| | | 25 | | | | | | | | | | 25 |
| | | 30 | | | | | | | | | | 30 |
| | | 40 | | | | | | 95D01556 | 1-51 | | | 40 |
| | | 50 | | | | | | | | | | 50 |

## 460V AC – Main Input Disconnect Drive Packages (Style A/M)

| Input Voltage | Type | Hp | Input Line Reactor | Drawing Schematic | Page | interconnect | Page | Layout | Page | Outline | Page | Hp |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 460V AC | NEMA/UL Type 1 | 3 | No | 98D00697 | 1-10 | 97D00696 | 1-17 | 95D00758 | 1-22 | 95D00689 | 1-53 | 3 |
| | | 5 | | | | | | | | | | 5 |
| | | 7.5 | | | | | | | | | | 7.5 |
| | | 10 | | | | | | | | | | 10 |
| | | 15 | | | | | | | | | | 15 |
| | | 20 | | | | | | | | | | 20 |
| | | 25 | | | | | | 95D00759 | 1-23 | 95D00691 | 1-54 | 25 |
| | | 30 | | | | | | | | | | 30 |
| | | 40 | | | | | | | | | | 40 |
| | | 50 | | | | | | 95D00760 | 1-25 | 95D00693 | 1-56 | 50 |
| | | 60 | | | | | | | | | | 60 |
| | | 75 | | | | | | | | | | 75 |
| | | 100 | | | | | | | | | | 100 |
| | | 125 | | | | | | 95D01262 | 1-27 | 95D01264 | 1-58 | 125 |
| | | 150 | | | | | | | | | | 150 |
| | | 200 | | 98D01888 | 1-12 | 97D01890 | 1-19 | 95D01862 | 1-28 | 95D01866 | 1-59 | 200 |
| | | 250 | | 98D01887 | 1-13 | 97D01889 | 1-20 | | | | | 250 |
| | | 300 | | | | | | 95D01864 | 1-29 | 95D01868 | 1-60 | 300 |
| | | 350 | | | | | | | | | | 350 |
| | | 3 | Yes | 98D00756 | 1-11 | 97D00754 | 1-18 | 95D00791 | 1-30 | 95D00690 | 1-61 | 3 |
| | | 5 | | | | | | | | | | 5 |
| | | 7.5 | | | | | | | | | | 7.5 |
| | | 10 | | | | | | | | | | 10 |
| | | 15 | | | | | | 95D00792 | 1-31 | 95D00753 | 1-62 | 15 |
| | | 20 | | | | | | | | | | 20 |
| | | 25 | | | | | | 95D01367 | 1-32 | 95D01359 | 1-63 | 25 |
| | | 30 | | | | | | | | | | 30 |
| | | 40 | | | | | | | | | | 40 |
| | | 50 | | | | | | 95D01369 | 1-34 | 95D01361 | 1-65 | 50 |
| | | 60 | | | | | | | | | | 60 |
| | | 75 | | | | | | | | | | 75 |
| | | 100 | | | | | | | | | | 100 |
| | | 125 | | | | | | 95D01370 | 1-35 | 95D01362 | 1-66 | 125 |
| | | 150 | | | | | | | | | | 150 |
| | NEMA/UL Type 12 | 3 | With or Without | 98D01535 | 1-14 | 97D01548 | 1-21 | 95D01575 | 1-36 | 95D01552 | 1-67 | 3 |
| | | 5 | | | | | | | | | | 5 |
| | | 7.5 | | | | | | | | | | 7.5 |
| | | 10 | | | | | | | | | | 10 |
| | | 15 | | | | | | | | | | 15 |
| | | 20 | | | | | | | | | | 20 |
| | | 25 | | | | | | 95D01576 | 1-37 | | | 25 |
| | | 30 | | | | | | | | | | 30 |
| | | 40 | | | | | | | | | | 40 |
| | | 50 | | | | | | 95D01577 | 1-38 | | | 50 |
| | | 60 | | | | | | | | | | 60 |
| | | 75 | | | | | | 95D01578 | 1-39 | | | 75 |
| | | 100 | | | | | | | | | | 100 |
| | | 125 | | | | | | 95D01579 | 1-40 | | | 125 |
| | | 150 | | | | | | | | | | 150 |

| Input Voltage | Type | Hp | Input Line Reactor | Drawing | | | | | | | | Hp |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Schematic | *Page* | interconnect | *Page* | Layout | *Page* | Outline | *Page* | |
| 460V AC | NEMA/UL Type 4 | 3 | With or Without | 98D01537 | 1-15 | 97D01548 | 1-21 | 95D02442 | 1-41 | 95D01551 | 1-68 | 3 |
| | | 5 | | | | | | | | | | 5 |
| | | 7.5 | | | | | | 95D01563 | 1-42 | | | 7.5 |
| | | 10 | | | | | | | | | | 10 |
| | | 15 | | | | | | | | | | 15 |
| | | 20 | | | | | | | | | | 20 |
| | | 25 | | | | | | 95D01564 | 1-43 | | | 25 |
| | | 30 | | | | | | 95D01565 | 1-44 | | | 30 |
| | | 40 | | | | | | | | | | 40 |
| | | 50 | | | | | | 95D01566 | 1-45 | | | 50 |
| | | 60 | | | | | | | | | | 60 |
| | | 75 | | | | | | 95D01567 | 1-46 | | | 75 |
| | | 100 | | | | | | | | | | 100 |
| | | 125 | | 98D01538 | 1-16 | | | 95D01568 | 1-47 | | | 125 |
| | | 150 | | | | | | | | | | 150 |
| | NEMA/UL Type 3R | 3 | With or Without | 98D01535 | 1-14 | 97D01548 | 1-21 | 95D01553 | 1-48 | 95D01550 | 1-69 | 3 |
| | | 5 | | | | | | | | | | 5 |
| | | 7.5 | | | | | | | | | | 7.5 |
| | | 10 | | | | | | | | | | 10 |
| | | 15 | | | | | | | | | | 15 |
| | | 20 | | | | | | | | | | 20 |
| | | 25 | | | | | | 95D01554 | 1-49 | | | 25 |
| | | 30 | | | | | | | | | | 30 |
| | | 40 | | | | | | | | | | 40 |
| | | 50 | | | | | | 95D01555 | 1-50 | | | 50 |
| | | 60 | | | | | | | | | | 60 |
| | | 75 | | | | | | 95D01556 | 1-51 | | | 75 |
| | | 100 | | | | | | | | | | 100 |
| | | 125 | | | | | | 95D01557 | 1-52 | | | 125 |
| | | 150 | | | | | | | | | | 150 |

## Schematic Drawings

**Figure 1.1 3.0…50 Hp, 208V AC & 3.0…150 Hp, 460V AC Drives - NEMA/UL Type 1**

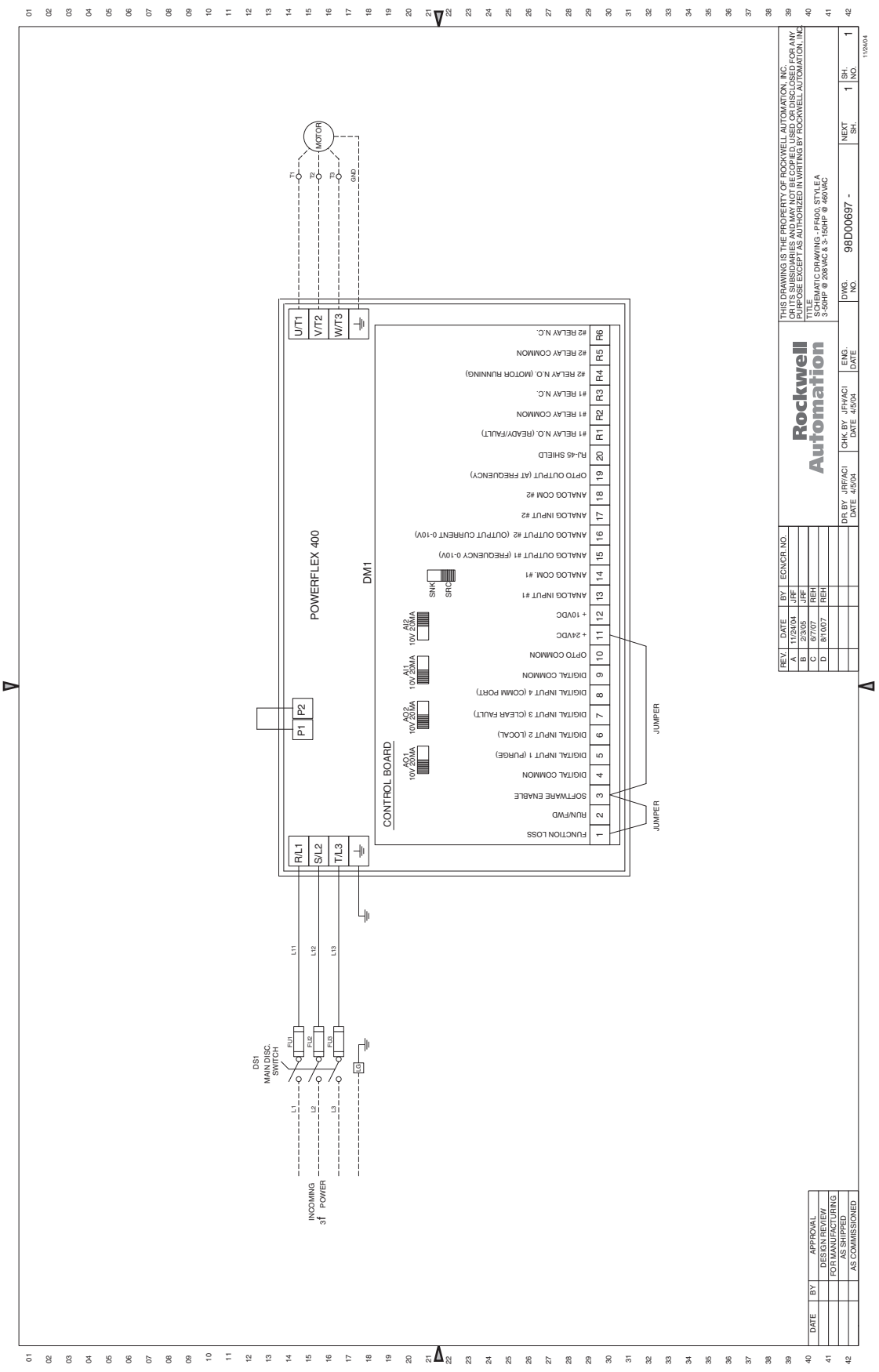


**Figure 1.2 3.0...50 Hp, 208V AC & 3.0...150 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1**

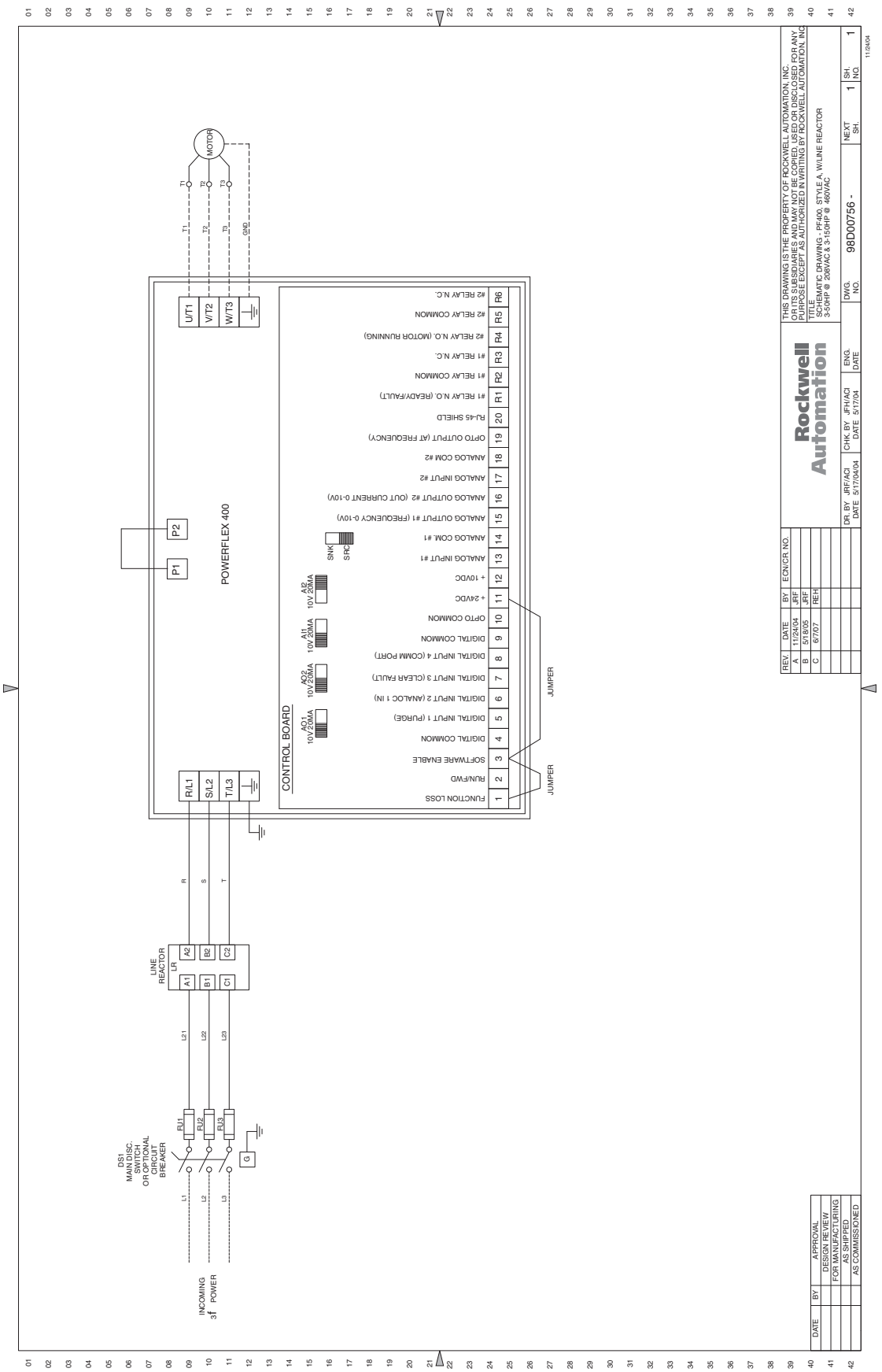


**Figure 1.3 200 Hp, 460V AC Drives - NEMA/UL Type 1**

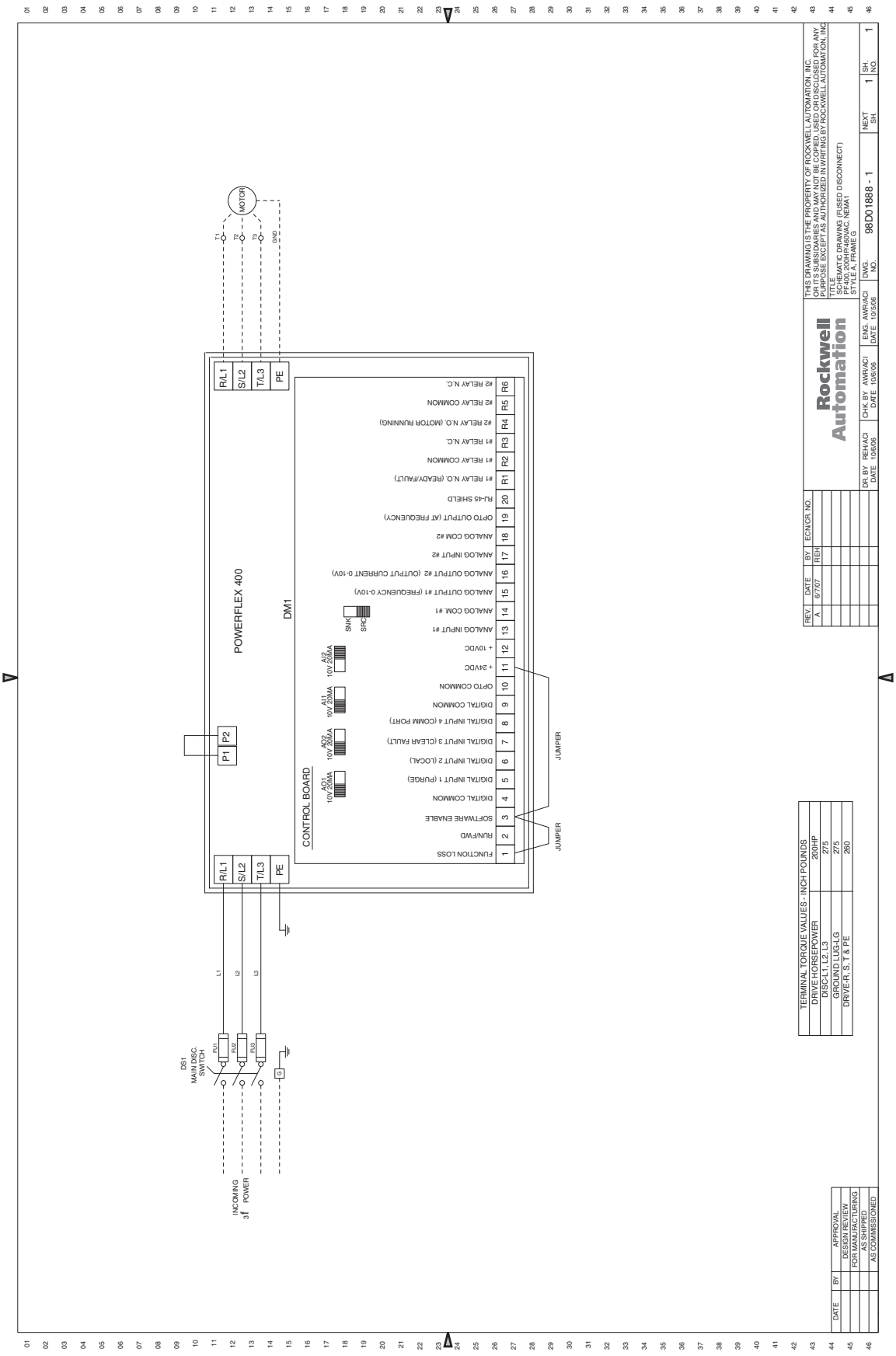


**Figure 1.4 250…350 Hp, 460V AC Drives - NEMA/UL Type 1**

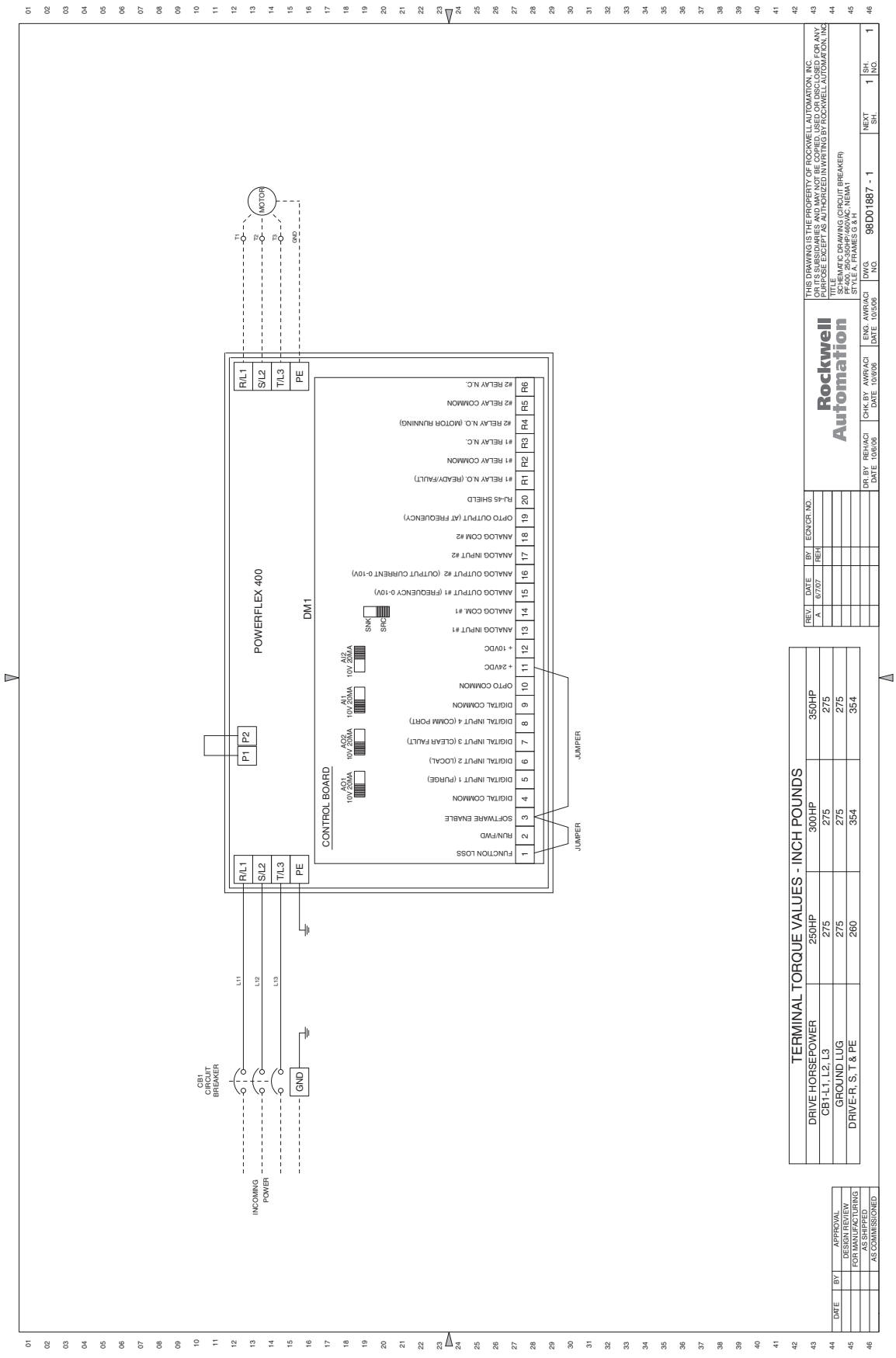
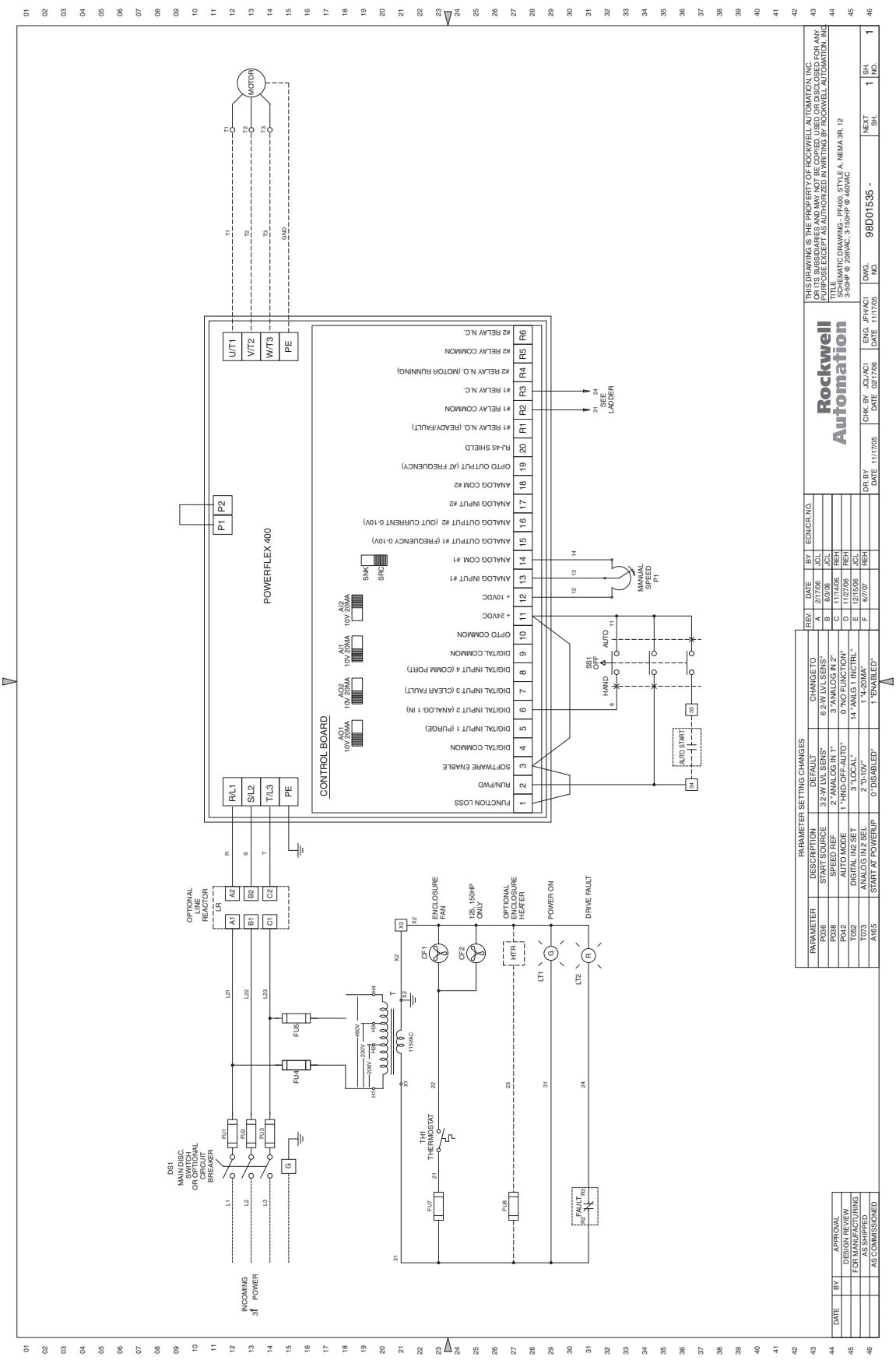

TERMINAL TORQUE VALUES - INCH POUNDS
DRIVE HORSEPOWER 250HP 300HP 350HP
CB1-L1, L2, L3 275 275 275
GROUND LUG 275 275 275
DRIVE-R, S, T & PE 260 354 354
POWERFLEX 400
DM1
CONTROL BOARD
CB1 CIRCUIT BREAKER
INCOMING POWER
MOTOR
JUMPER
JUMPER
Rockwell Automation
THIS DRAWING IS THE PROPERTY OF ROCKWELL AUTOMATION, INC. OR IT'S SUBSIDIARIES AND MAY NOT BE COPIED, USED OR DISCLOSED FOR ANY PURPOSE EXCEPT AS AUTHORIZED IN WRITING BY ROCKWELL AUTOMATION, INC.
SCHEMATIC DRAWING (CIRCUIT BREAKER)
98D01887 - 1

**Figure 1.5 3.0…50 Hp, 208V AC & 3.0…150 Hp, 460V AC Drives - NEMA/UL Type 12 & 3R**


POWERFLEX 400
CONTROL BOARD
MOTOR
INCOMING 3ϕ POWER
OPTIONAL LINE REACTOR
DS1 MAIN DISC. SWITCH OR OPTIONAL CIRCUIT BREAKER
ENCLOSURE FAN
125, 150HP ONLY
OPTIONAL ENCLOSURE HEATER
POWER ON
DRIVE FAULT
TH1 THERMOSTAT
MANUAL SPEED P1
SEE LADDER
AUTO START
HAND OFF AUTO
FUNCTION LOSS
RUN/FWD
SOFTWARE ENABLE
DIGITAL COMMON
DIGITAL INPUT 1 (PURGE)
DIGITAL INPUT 2 (ANALOG 1 IN)
DIGITAL INPUT 3 (CLEAR FAULT)
DIGITAL INPUT 4 (COMM PORT)
OPTO COMMON
+ 24VDC
+ 10VDC
ANALOG INPUT #1
ANALOG COM. #1
ANALOG OUTPUT #1 (FREQUENCY 0-10V)
ANALOG OUTPUT #2 (OUT CURRENT 0-10V)
ANALOG INPUT #2
ANALOG COM #2
OPTO OUTPUT (AT FREQUENCY)
RJ-45 SHIELD
#1 RELAY N.O. (READY/FAULT)
#1 RELAY COMMON
#1 RELAY N.C.
#2 RELAY N.O. (MOTOR RUNNING)
#2 RELAY COMMON
#2 RELAY N.C.
PARAMETER SETTING CHANGES
PARAMETER | DESCRIPTION | DEFAULT | CHANGE TO
P036 | START SOURCE | 3 2-W LVL SENS" | 6 2-W LVL SENS"
P038 | SPEED REF | 2 "ANALOG IN 1" | 3 "ANALOG IN 2"
P042 | AUTO MODE | 1 "HND-OFF-AUTO" | 0 "NO FUNCTION"
T052 | DIGITAL IN2 SET | 3 "LOCAL" | 14 "ANLG 1 INCTRL"
T073 | ANALOG IN 2 SEL | 2 "0-10V" | 1 "4-20MA"
A165 | START AT POWERUP | 0 "DISABLED" | 1 "ENABLED"
REV | DATE | BY | ECN/CR NO.
A | 2/17/06 | JCL
B | 8/31/06 | JCL
C | 11/14/06 | REH
D | 11/27/06 | REH
E | 12/15/06 | JCL
F | 6/7/07 | REH
DR. BY DATE 11/17/05
CHK. BY DATE 02/17/06
JCL/ACI 11/17/05
ENG. JFH/ACI 11/17/05
Rockwell Automation
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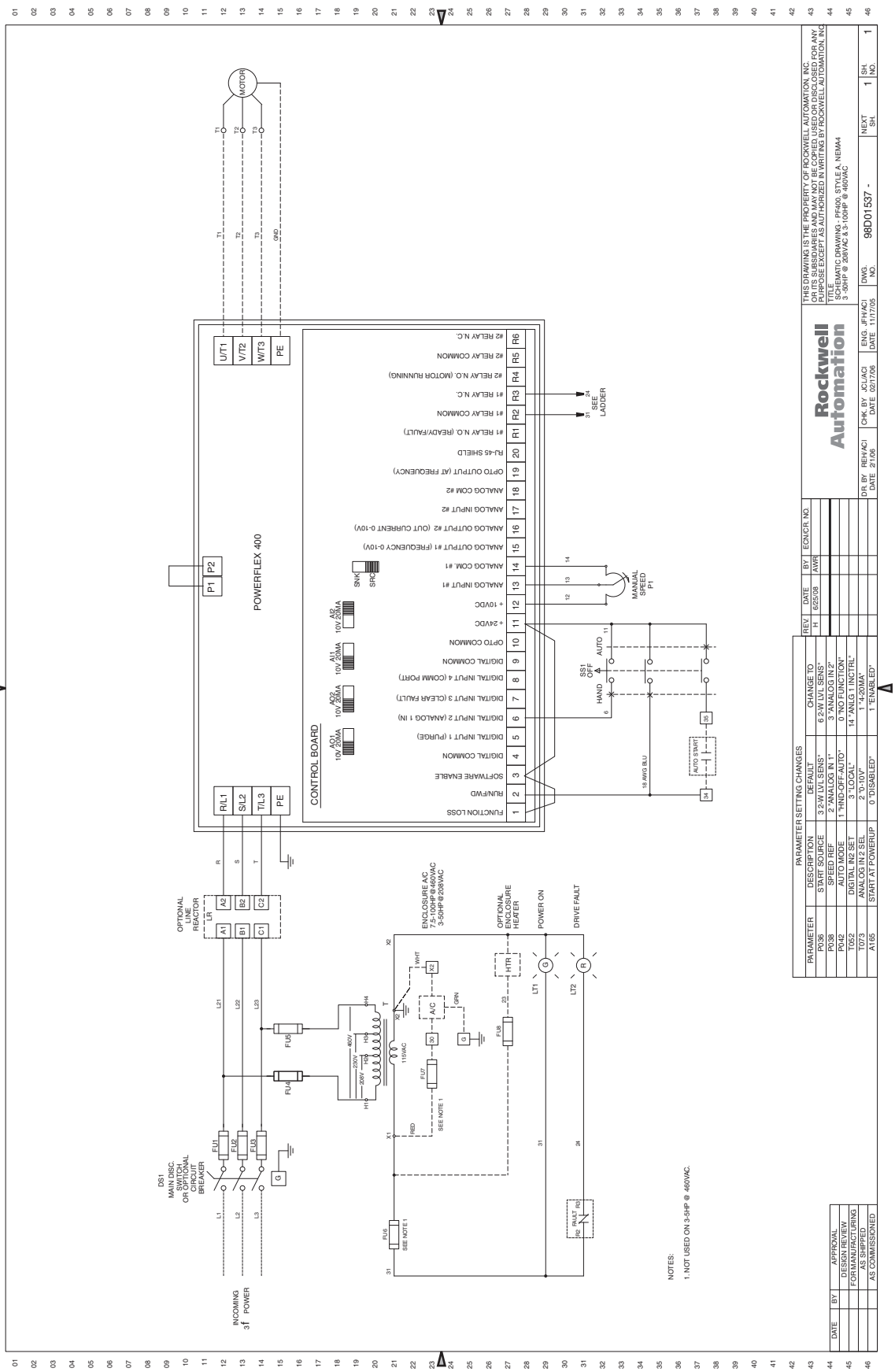
TITLE SCHEMATIC DRAWING - PF400, STYLE A, NEMA 3R, 12 3-50HP @ 208VAC, 3-150HP @ 460VAC
DWG. NO. 98D01535 -
NEXT SH. 1
SH. NO. 1
DATE | BY | APPROVAL
DESIGN REVIEW
FOR MANUFACTURING
AS SHIPPED
AS COMMISSIONED

**Figure 1.6 3.0…50 Hp, 208V AC & 3.0…100 Hp, 460V AC Drives - NEMA/UL Type 4**


POWERFLEX 400
CONTROL BOARD
MOTOR
U/T1
V/T2
W/T3
PE
R/L1
S/L2
T/L3
P1
P2
SNK
SRC
MANUAL SPEED P1
SEE LADDER
OPTIONAL LINE REACTOR
DS1 MAIN DISC. SWITCH OR OPTIONAL CIRCUIT BREAKER
INCOMING 3f POWER
ENCLOSURE A/C 2.5-20HP@460VAC 3-50HP@208VAC
OPTIONAL ENCLOSURE HEATER
POWER ON
DRIVE FAULT
NOTES:
1. NOT USED ON 3-5HP @ 460VAC.
PARAMETER SETTING CHANGES
PARAMETER | DESCRIPTION | DEFAULT | CHANGE TO
P036 | START SOURCE | 3 "2-W LVL SENS" | 6 "2-W LVL SENS"
P038 | SPEED REF | 2 "ANALOG IN 1" | 3 "ANALOG IN 2"
P042 | ACCEL TIME 1 | 10.0 SECONDS | 5.0 SECONDS
T052 | DIGITAL IN2 SET | 1 "ENBL-OFF-AUTO" | 14 "ANLG 1 INCTRL"
T073 | ANALOG IN 2 SEL | 2 "0-10V" | 1 "4-20MA"
A165 | START AT POWERUP | 0 "DISABLED" | 1 "ENABLED"
REV | DATE | BY | ECN/CR NO.
H | 6/25/08 | AWR
DR BY REV.HIST DATE 2/1/08
CHK BY (CLIAD) DATE 02/17/08
ENG. (FHAD) DATE 1/17/705
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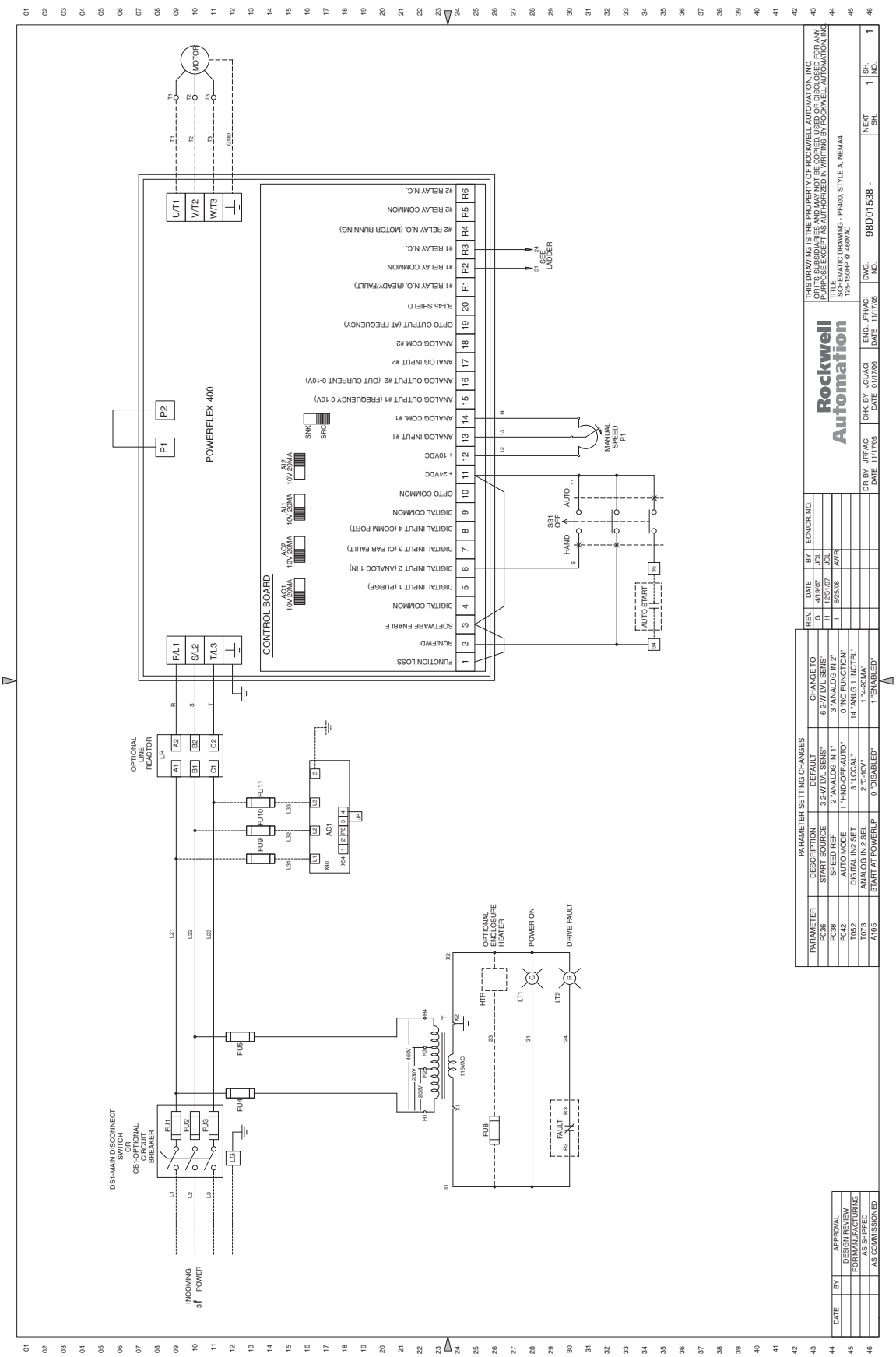
TITLE: SCHEMATIC DRAWING - PF400, STYLE A, NEMA4
3 -50HP @ 208VAC & 3 - 100HP @ 460VAC
DWG. NO. 98D01537 -
NEXT SH. 1
SH. NO. 1
DATE | BY | APPROVAL
DESIGN REVIEW
FOR MANUFACTURING
AS BUILT
AS COMMISSIONED

**Figure 1.7 125…150 Hp, 460V AC Drives - NEMA/UL Type 4**


POWERFLEX 400
CONTROL BOARD
MOTOR
MANUAL SPEED P1
AUTO START
OPTIONAL LINE REACTOR
DS1-MAIN DISCONNECT SWITCH OR CB1-OPTIONAL CIRCUIT BREAKER
INCOMING 3f POWER
OPTIONAL ENCLOSURE HEATER
POWER ON
DRIVE FAULT
PARAMETER SETTING CHANGES
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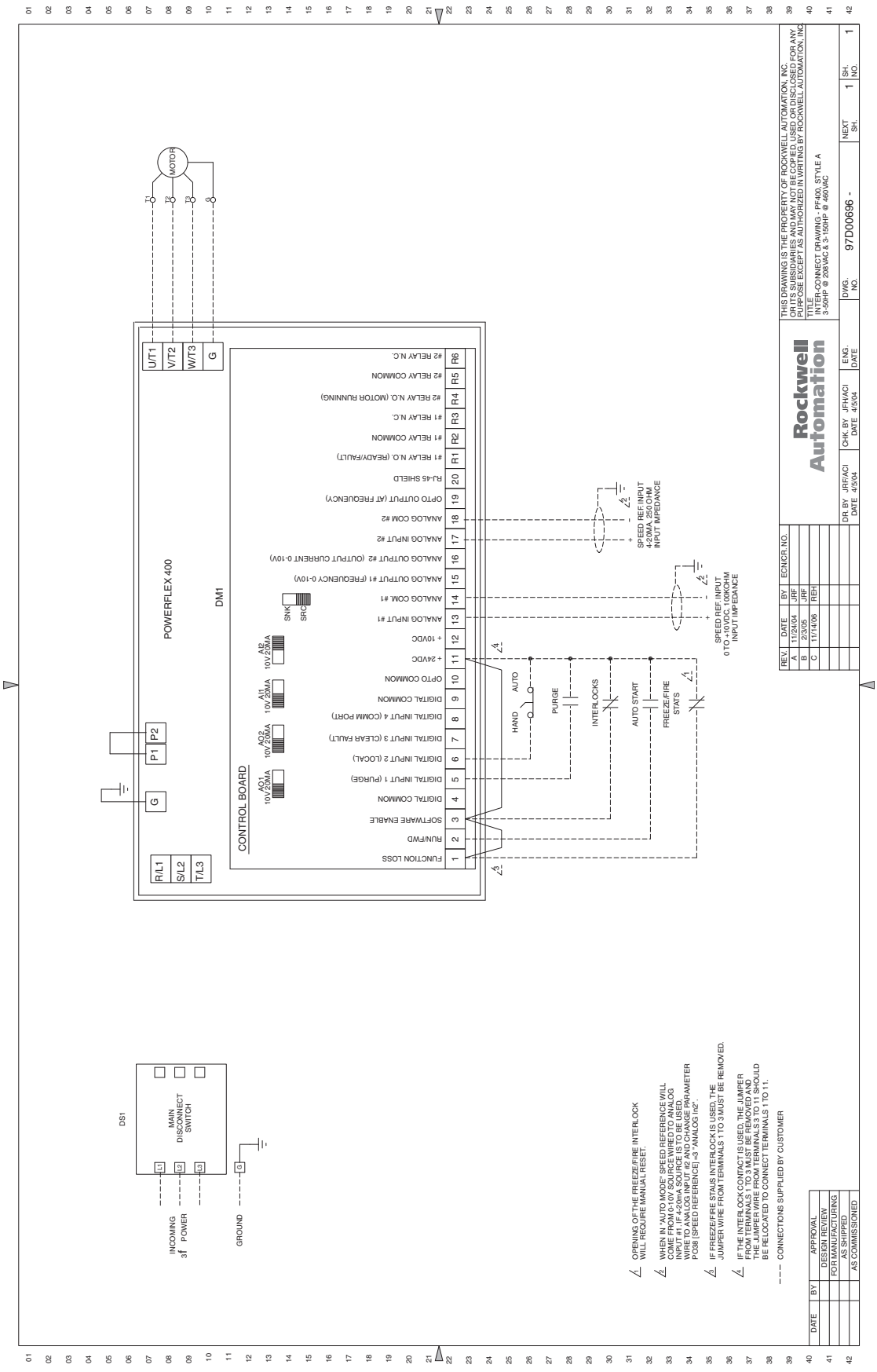
Rockwell Automation
98D01538 -

## interconnect Drawings

**Figure 1.8 3.0...50 Hp, 208V AC & 3.0...150 Hp, 460V AC Drives - NEMA/UL Type 1**


POWERFLEX 400
DM1
CONTROL BOARD
MOTOR
U/T1
V/T2
W/T3
G
R/L1
S/L2
T/L3
P1
P2
DS1
MAIN DISCONNECT SWITCH
INCOMING 3ϕ POWER
GROUND
HAND
AUTO
PURGE
INTERLOCKS
AUTO START
FREEZE/FIRE STATS
SPEED REF INPUT 4-20MA, 250 OHM INPUT IMPEDANCE
SPEED REF INPUT 0 TO +10 VDC, 100KOHM INPUT IMPEDANCE
FUNCTION LOSS
RUN/FWD
SOFTWARE ENABLE
DIGITAL COMMON
DIGITAL INPUT 1 (PURGE)
DIGITAL INPUT 2 (LOCAL)
DIGITAL INPUT 3 (CLEAR FAULT)
DIGITAL INPUT 4 (COMM PORT)
DIGITAL COMMON
OPTO COMMON
+24VDC
+10VDC
ANALOG INPUT #1
ANALOG COM. #1
ANALOG OUTPUT #1 (FREQUENCY 0-10V)
ANALOG OUTPUT #2 (OUTPUT CURRENT 0-10V)
ANALOG INPUT #2
ANALOG COM #2
OPTO OUTPUT (AT FREQUENCY)
RJ-45 SHIELD
#1 RELAY N.O. (READY/FAULT)
#1 RELAY COMMON
#1 RELAY N.C.
#2 RELAY N.O. (MOTOR RUNNING)
#2 RELAY COMMON
#2 RELAY N.C.
SNK
SRC
AO1 10V 20MA
AO2 10V 20MA
AI1 10V 20MA
AI2 10V 20MA
1 OPENING OF THE FREEZE/FIRE INTERLOCK WILL REQUIRE MANUAL RESET.
2 WHEN IN "AUTO MODE" SPEED REFERENCE WILL COME FROM 0-10V SOURCE WIRED TO ANALOG INPUT #1. IF 4-20mA SOURCE IS TO BE USED, WIRE TO ANALOG INPUT #2 AND CHANGE PARAMETER P038 [SPEED REFERENCE] =3 "ANALOG IN2".
3 IF FREEZE/FIRE STAUS INTERLOCK IS USED, THE JUMPER WIRE FROM TERMINALS 1 TO 3 MUST BE REMOVED.
4 IF THE INTER-LOCK CONTACT IS USED, THE JUMPER FROM TERMINALS 1 TO 3 MUST BE REMOVED AND THE JUMPER WIRE FROM TERMINALS 3 TO 11 SHOULD BE RELOCATED TO CONNECT TERMINALS 1 TO 11.
--- CONNECTIONS SUPPLIED BY CUSTOMER
REV. DATE BY ECN/CR NO.
A 11/24/04 JRF
B 2/3/05 JRF
C 11/14/06 REH
DR. BY JRF/ACI DATE 4/5/04
CHK. BY JFH/ACI DATE 4/5/04
ENG. DATE
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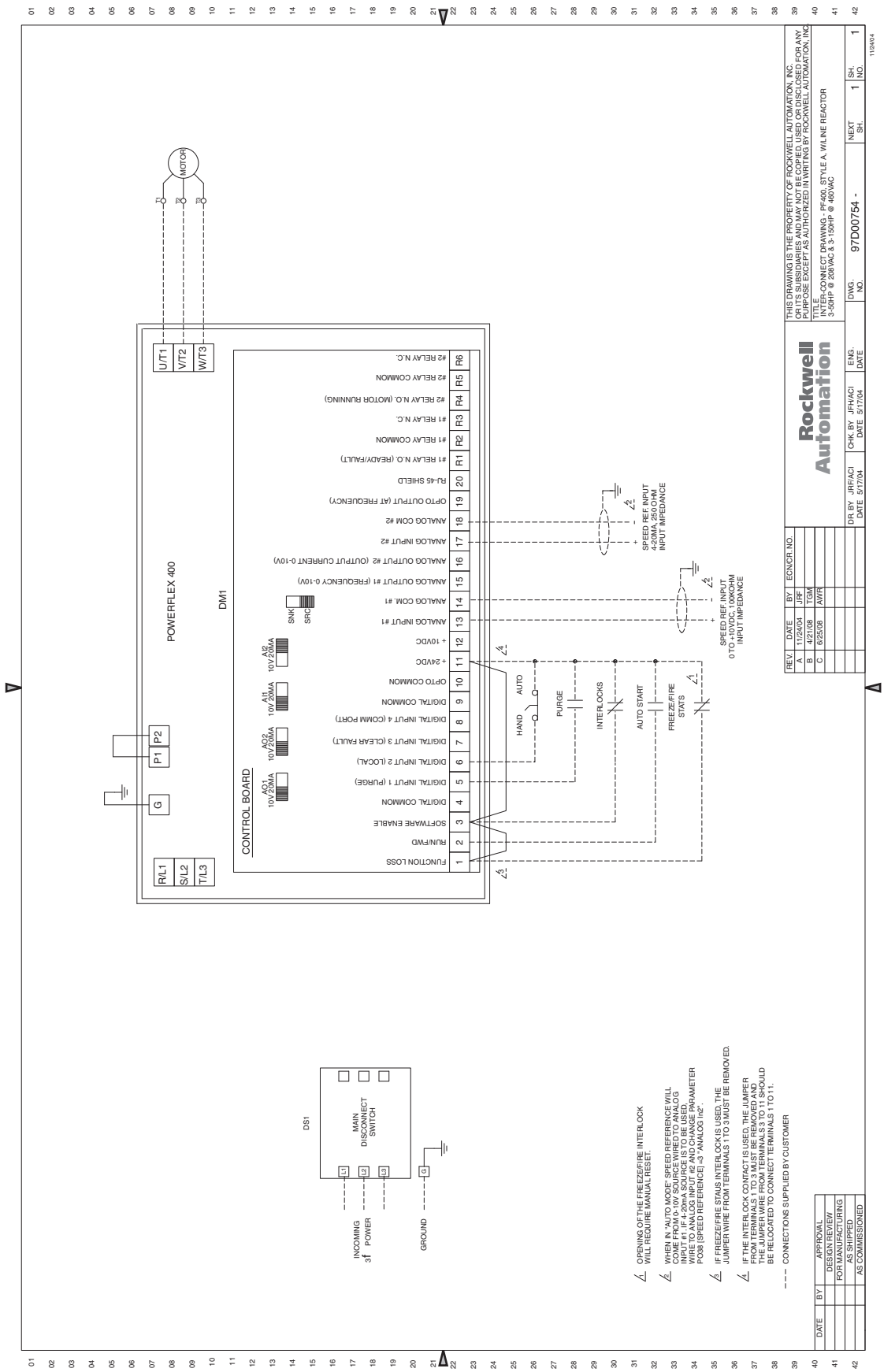
TITLE
INTER-CONNECT DRAWING - PF400, STYLE A
3-50HP @ 208 VAC & 3-150HP @ 460VAC
DWG. NO. 97D00696 -
NEXT SH. 1
SH. NO. 1
DATE BY APPROVAL
DESIGN REVIEW
FOR MANUFACTURING
AS SHIPPED
AS COMMISSIONED

**Figure 1.9 3.0…50 Hp, 208V AC & 3.0…150 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1**


MOTOR
U/T1
V/T2
W/T3
R/L1
S/L2
T/L3
G
P1
P2
POWERFLEX 400
DM1
CONTROL BOARD
SNK
SRC
FUNCTION LOSS
RUN/FWD
SOFTWARE ENABLE
DIGITAL COMMON
DIGITAL INPUT 1 (PURGE)
DIGITAL INPUT 2 (LOCAL)
DIGITAL INPUT 3 (CLEAR FAULT)
DIGITAL INPUT 4 (COMM PORT)
DIGITAL COMMON
OPTO COMMON
+ 24VDC
+ 10VDC
ANALOG INPUT #1
ANALOG COM. #1
ANALOG OUTPUT #1 (FREQUENCY 0-10V)
ANALOG OUTPUT #2 (OUTPUT CURRENT 0-10V)
ANALOG INPUT #2
ANALOG COM #2
OPTO OUTPUT (AT FREQUENCY)
RJ-45 SHIELD
#1 RELAY N.O. (READY/FAULT)
#1 RELAY COMMON
#1 RELAY N.C.
#2 RELAY N.O. (MOTOR RUNNING)
#2 RELAY COMMON
#2 RELAY N.C.
HAND
AUTO
PURGE
INTERLOCKS
AUTO START
FREEZE/FIRE STAT'S
SPEED REF. INPUT 4-20MA, 250 OHM INPUT IMPEDANCE
SPEED REF. INPUT 0 TO +10 VDC, 100KOHM INPUT IMPEDANCE
DS1
MAIN DISCONNECT SWITCH
INCOMING 3ϕ POWER
GROUND
OPENING OF THE FREEZE/FIRE INTERLOCK WILL REQUIRE MANUAL RESET.
WHEN IN "AUTO MODE" SPEED REFERENCE WILL COME FROM 0-10V SOURCE WIRED TO ANALOG INPUT #1. IF 4-20MA SOURCE IS TO BE USED, WIRE TO ANALOG INPUT #2 AND CHANGE PARAMETER P038 [SPEED REFERENCE] =3 "ANALOG In2".
IF FREEZE/FIRE STAUS INTERLOCK IS USED, THE JUMPER WIRE FROM TERMINALS 1 TO 3 MUST BE REMOVED.
IF THE INTERLOCK CONTACT IS USED, THE JUMPER FROM TERMINALS 1 TO 3 MUST BE REMOVED AND THE JUMPER WIRE FROM TERMINALS 3 TO 11 SHOULD BE RELOCATED TO CONNECT TERMINALS 1 TO 11.
--- CONNECTIONS SUPPLIED BY CUSTOMER
REV. DATE BY ECN/CR. NO.
A 11/24/04 JRF
B 4/21/08 TGM
C 6/25/08 AWR
DR. BY JRF/ACI DATE 5/17/04
CHK. BY JFH/ACI DATE 5/17/04
ENG. DATE
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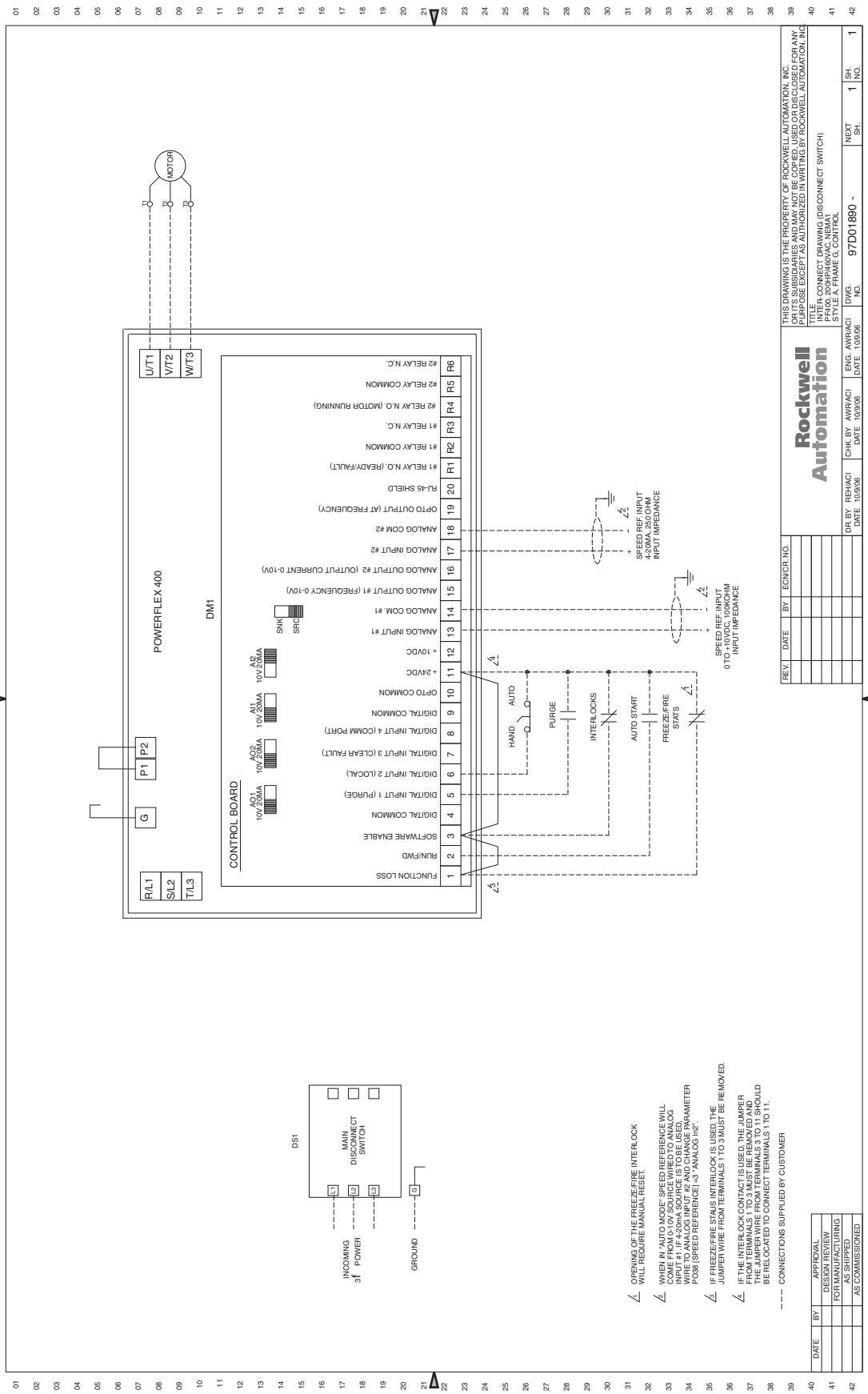
TITLE INTER-CONNECT DRAWING - PF400, STYLE A, W/LINE REACTOR 3-50HP @ 208VAC & 3-150HP @ 460VAC
DWG. NO. 97D00754 -
NEXT SH. 1
SH. NO. 1
DATE BY APPROVAL
DESIGN REVIEW
FOR MANUFACTURING
AS SHIPPED
AS COMMISSIONED

**Figure 1.10 200 Hp, 460V AC Drives - NEMA/UL Type 1**


POWERFLEX 400
DM1
CONTROL BOARD
MOTOR
U/T1
V/T2
W/T3
R/L1
S/L2
T/L3
P1
P2
G
FUNCTION LOSS
RUN/FWD
SOFTWARE ENABLE
DIGITAL COMMON
DIGITAL INPUT 1 (PURGE)
DIGITAL INPUT 2 (LOCAL)
DIGITAL INPUT 3 (CLEAR FAULT)
DIGITAL INPUT 4 (COMM PORT)
DIGITAL COMMON
OPTO COMMON
+ 24VDC
+ 10VDC
ANALOG INPUT #1
ANALOG COM. #1
ANALOG OUTPUT #1 (FREQUENCY 0-10V)
ANALOG OUTPUT #2 (OUTPUT CURRENT 0-10V)
ANALOG INPUT #2
ANALOG COM #2
OPTO OUTPUT (AT FREQUENCY)
RJ-45 SHIELD
#1 RELAY N.O. (READY/FAULT)
#1 RELAY COMMON
#1 RELAY N.C.
#2 RELAY N.O. (MOTOR RUNNING)
#2 RELAY COMMON
#2 RELAY N.C.
SNK
SRC
HAND
AUTO
PURGE
INTERLOCKS
AUTO START
FREEZE/FIRE STATS
SPEED REF. INPUT 4-20MA, 250 OHM INPUT IMPEDANCE
SPEED REF. INPUT 0 TO +10VDC, 100KOHM INPUT IMPEDANCE
DS1
MAIN DISCONNECT SWITCH
INCOMING 3ϕ POWER
GROUND
OPENING OF THE FREEZE/FIRE INTERLOCK WILL REQUIRE MANUAL RESET.
WHEN IN "AUTO MODE" SPEED REFERENCE WILL COME FROM 0-10V SOURCE WIRED TO ANALOG INPUT #1. IF 4-20mA SOURCE IS TO BE USED, WIRE TO ANALOG INPUT #2 AND CHANGE PARAMETER P038 [SPEED REFERENCE] AS "ANALOG IN2".
IF FREEZE/FIRE STAT IS INTERLOCK IS USED, THE JUMPER WIRE FROM TERMINALS 1 TO 3 MUST BE REMOVED.
IF THE INTERLOCK CONTACT IS USED, THE JUMPER FROM TERMINALS 1 TO 3 MUST BE REMOVED AND THE JUMPER WIRE FROM TERMINALS 3 TO 11 SHOULD BE RELOCATED TO CONNECT TERMINALS 1 TO 11.
--- CONNECTIONS SUPPLIED BY CUSTOMER
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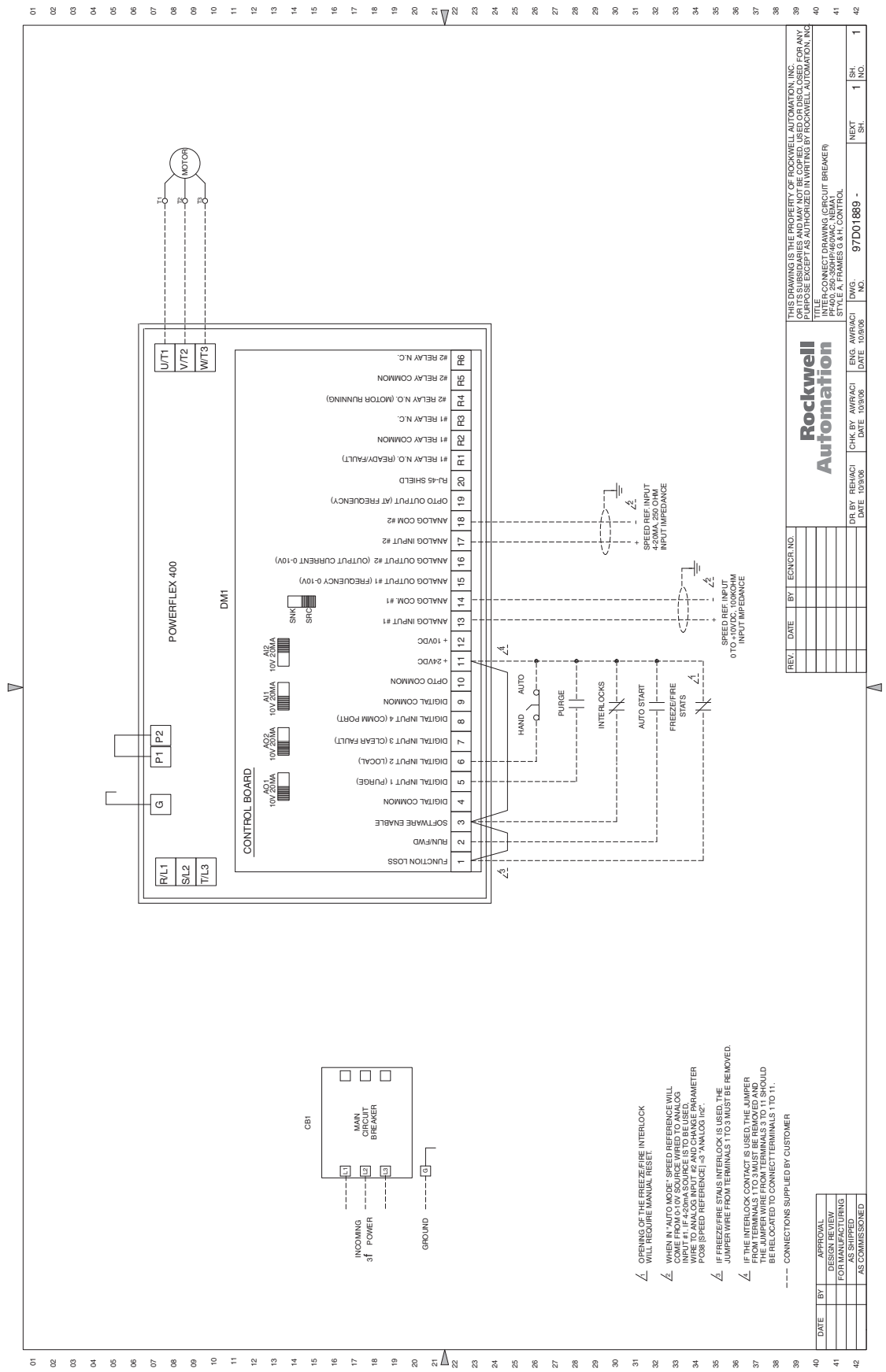
TITLE
INTER-CONNECT DRAWING (DISCONNECT SWITCH)
PH100, 200HP/460VAC, NEMA1
STYLE A, FRAME G, CONTROL
DWG. NO. 97D01890 -
NEXT SH. 1
SH. NO. 1
DR. BY REH/ACI DATE 10/9/06
CHK. BY AWR/ACI DATE 10/9/06
ENG. AWR/ACI DATE 10/9/06
REV. DATE BY ECN/CR NO.
DATE BY APPROVAL
DESIGN REVIEW
FOR MANUFACTURING
AS SHIPPED
AS COMMISSIONED

**Figure 1.11 250…350 Hp, 460V AC Drives - NEMA/UL Type 1**


MOTOR
U/T1
V/T2
W/T3
POWERFLEX 400
DM1
CONTROL BOARD
R/L1
S/L2
T/L3
P1
P2
G
SINK
SRC
FUNCTION LOSS
RUN/FWD
SOFTWARE ENABLE
DIGITAL COMMON
DIGITAL INPUT 1 (PURGE)
DIGITAL INPUT 2 (LOCAL)
DIGITAL INPUT 3 (CLEAR FAULT)
DIGITAL INPUT 4 (COMM PORT)
DIGITAL COMMON
OPTO COMMON
+ 24VDC
+ 10VDC
ANALOG INPUT #1
ANALOG COM. #1
ANALOG OUTPUT #1 (FREQUENCY 0-10V)
ANALOG OUTPUT #2 (OUTPUT CURRENT 0-10V)
ANALOG INPUT #2
ANALOG COM #2
OPTO OUTPUT (AT FREQUENCY)
RJ-45 SHIELD
#1 RELAY N.O. (READY/FAULT)
#1 RELAY COMMON
#1 RELAY N.C.
#2 RELAY N.O. (MOTOR RUNNING)
#2 RELAY COMMON
#2 RELAY N.C.
HAND
AUTO
PURGE
INTERLOCKS
AUTO START
FREEZE/FIRE STATS
SPEED REF. INPUT 4-20MA, 250 OHM INPUT IMPEDANCE
SPEED REF. INPUT 0 TO +10VDC, 100K OHM INPUT IMPEDANCE
CB1
MAIN CIRCUIT BREAKER
INCOMING 3ϕ POWER
GROUND
OPENING OF THE FREEZE/FIRE INTERLOCK WILL REQUIRE MANUAL RESET.
WHEN IN "AUTO MODE" SPEED REFERENCE WILL COME FROM 0-10V SOURCE WIRED TO ANALOG INPUT #1, IF 4-20mA SOURCE IS TO BE USED, WIRE TO ANALOG INPUT #2 AND CHANGE PARAMETER P038 [SPEED REFERENCE] AS "ANALOG IN2".
IF FREEZE/FIRE STAUS INTERLOCK IS USED, THE JUMPER WIRE FROM TERMINALS 1 TO 3 MUST BE REMOVED.
IF THE INTERLOCK CONTACT IS USED, THE JUMPER FROM TERMINALS 1 TO 3 MUST BE REMOVED AND THE JUMPER WIRE FROM TERMINALS 3 TO 11 SHOULD BE RELOCATED TO CONNECT TERMINALS 1 TO 11.
--- CONNECTIONS SUPPLIED BY CUSTOMER
DATE
BY
APPROVAL
DESIGN REVIEW
FOR MANUFACTURING
AS SHIPPED
AS COMMISSIONED
REV.
DATE
BY
ECN/CR NO.
Rockwell Automation
DR. BY REHJACI DATE 10/9/06
CHK BY AWRJACI DATE 10/9/06
ENG. AWRJACI DATE 10/9/06
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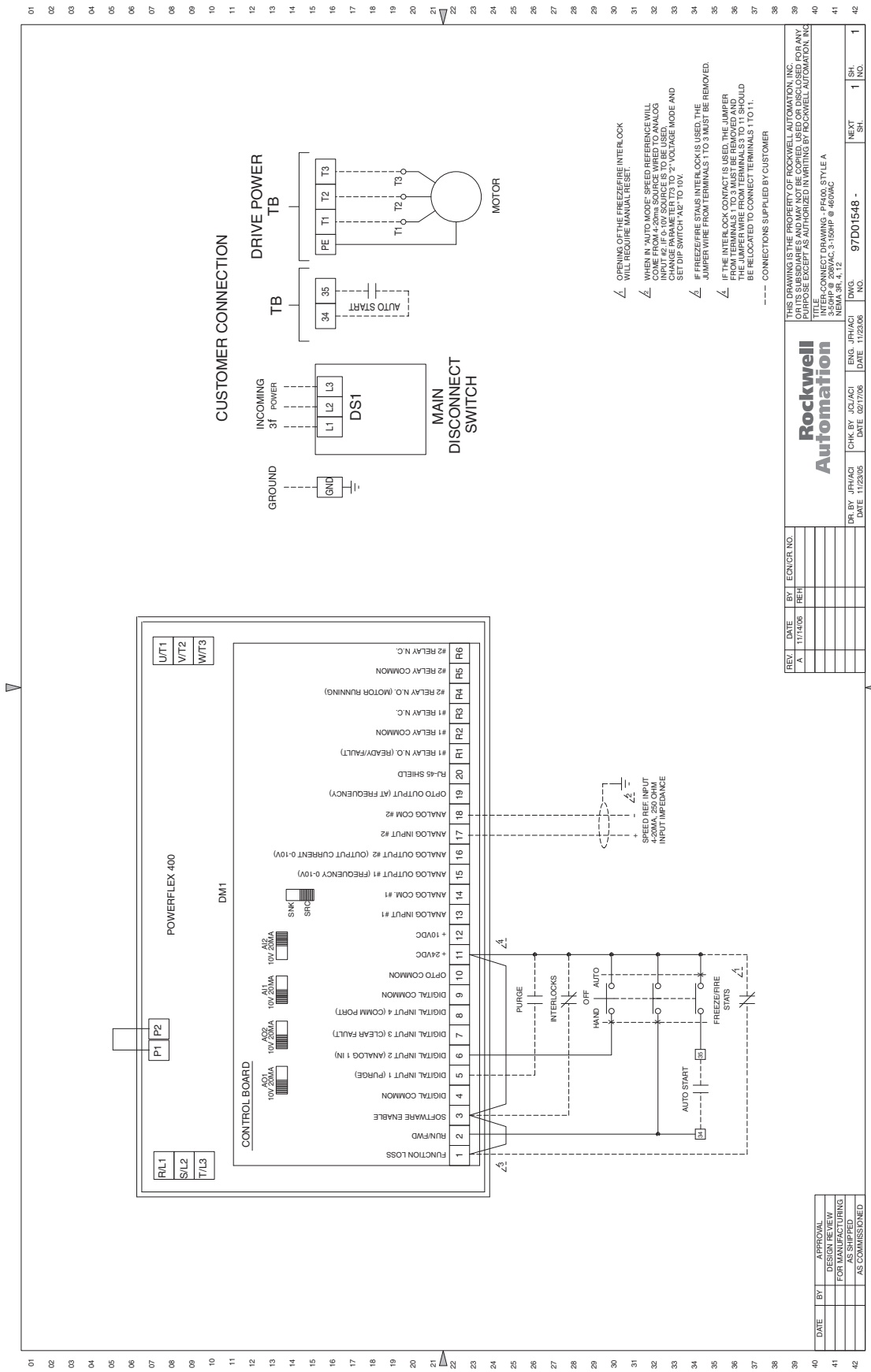
TITLE
INTER-CONNECT DRAWING (CIRCUIT BREAKER)
PANEL ASSEMBLY DRAWING, NEMA 1
STYLE A, FRAMES G & H, CONTROL
DWG. NO. 97D01889 -
NEXT SH.
SH. NO. 1 1

**Figure 1.12 3.0...50 Hp, 208V AC & 3.0...150 Hp, 460V AC Drives - NEMA/UL Type 12, 4, & 3R**


CUSTOMER CONNECTION
DRIVE POWER TB
TB
MOTOR
AUTO START
INCOMING 3f POWER
DS1
MAIN DISCONNECT SWITCH
GROUND
GND
L1 L2 L3
PE T1 T2 T3
34 35
T1 T2 T3
OPENING OF THE FREEZE/FIRE INTERLOCK WILL REQUIRE MANUAL RESET.
WHEN IN 'AUTO MODE' SPEED REFERENCE WILL COME FROM ANALOG SOURCE IS TO BE USED. INPUT #2 (IF 0-10V SOURCE IS TO BE USED. CHANGE PARAMETER T73 TO "2" VOLTAGE MODE AND SET DIP SWITCH "A2" TO 10V.
IF FREEZE/FIRE STATS INTERLOCK IS USED, THE JUMPER WIRE FROM TERMINALS 1 TO 3 MUST BE REMOVED.
IF THE INTERLOCK CONTACT IS USED, THE JUMPER FROM TERMINAL 1 TO 34 MUST BE REMOVED AND THE JUMPER WIRE FROM TERMINAL 1 TO 11 SHOULD BE RELOCATED TO CONNECT TERMINALS 1 TO 11.
--- CONNECTIONS SUPPLIED BY CUSTOMER
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Rockwell Automation
TITLE
INTER-CONNECT DRAWING - PF400, STYLE A
3.0HP - 200VAC, 3-150HP @ 460VAC
NEMA 3R, 4, 12
DWG. NO. 97D01548 -
NEXT SH.
SH. NO. 1
ENG. JFH/ACI DATE 11/23/06
CHK. BY JCL/ACI DATE 02/17/06
DR. BY JFH/ACI DATE 11/23/05
REV. DATE BY ECN/CR NO.
A 11/14/06 REH
DATE BY APPROVAL
DESIGN REVIEW
FOR MANUFACTURING
AS SHIPPED
AS COMMISSIONED
POWERFLEX 400
DM1
CONTROL BOARD
R/L1 S/L2 T/L3
U/T1 V/T2 W/T3
P1 P2
FUNCTION LOSS
RUN/FWD
SOFTWARE ENABLE
DIGITAL COMMON
DIGITAL INPUT 1 (PURGE)
DIGITAL INPUT 2 (ANALOG 1 IN)
DIGITAL INPUT 3 (CLEAR FAULT)
DIGITAL INPUT 4 (COMM PORT)
DIGITAL COMMON
OPTO COMMON
+ 24VDC
+ 10VDC
ANALOG INPUT #1
ANALOG COM. #1
ANALOG OUTPUT #1 (FREQUENCY 0-10V)
ANALOG OUTPUT #2 (OUTPUT CURRENT 0-10V)
ANALOG INPUT #2
ANALOG COM #2
OPTO OUTPUT (AT FREQUENCY)
RJ-45 SHIELD
#1 RELAY N.O. (READY/FAULT)
#1 RELAY COMMON
#1 RELAY N.C.
#2 RELAY N.O. (MOTOR RUNNING)
#2 RELAY COMMON
#2 RELAY N.C.
SINK SRC
AI1 10V 20MA
AI2 10V 20MA
AO1 10V 20MA
AO2 10V 20MA
SPEED REF. INPUT 4-20MA, 250 OHM INPUT IMPEDANCE
PURGE
INTERLOCKS
HAND OFF AUTO
AUTO START
FREEZE/FIRE STATS

## Layout Drawings

**Figure 1.13 3.0…10 Hp, 208V AC & 3.0…20 Hp, 460V AC Drives - NEMA/UL Type 1**

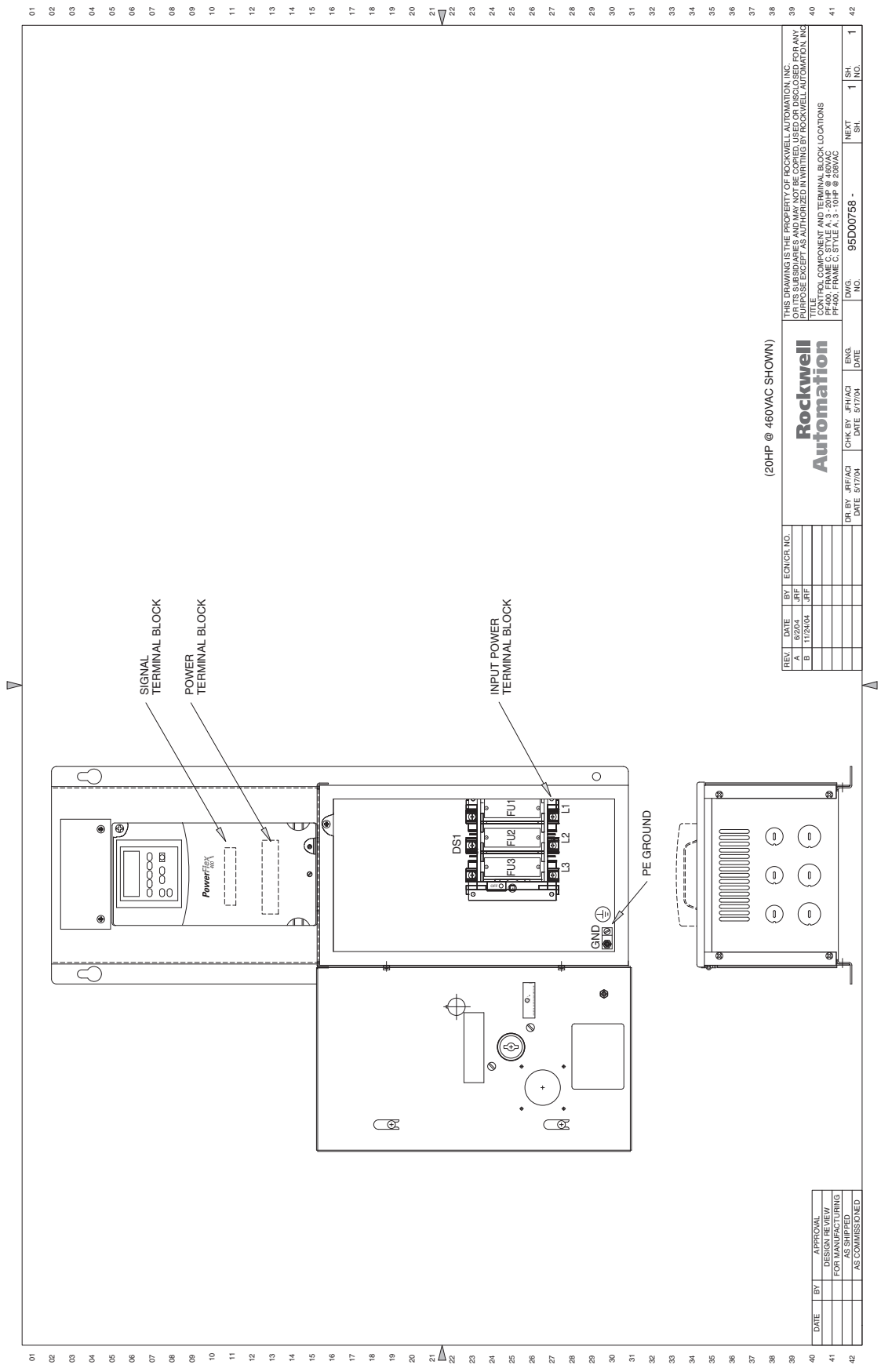


**Figure 1.14 15…20 Hp, 208V AC & 25…40 Hp, 460V AC Drives - NEMA/UL Type 1**

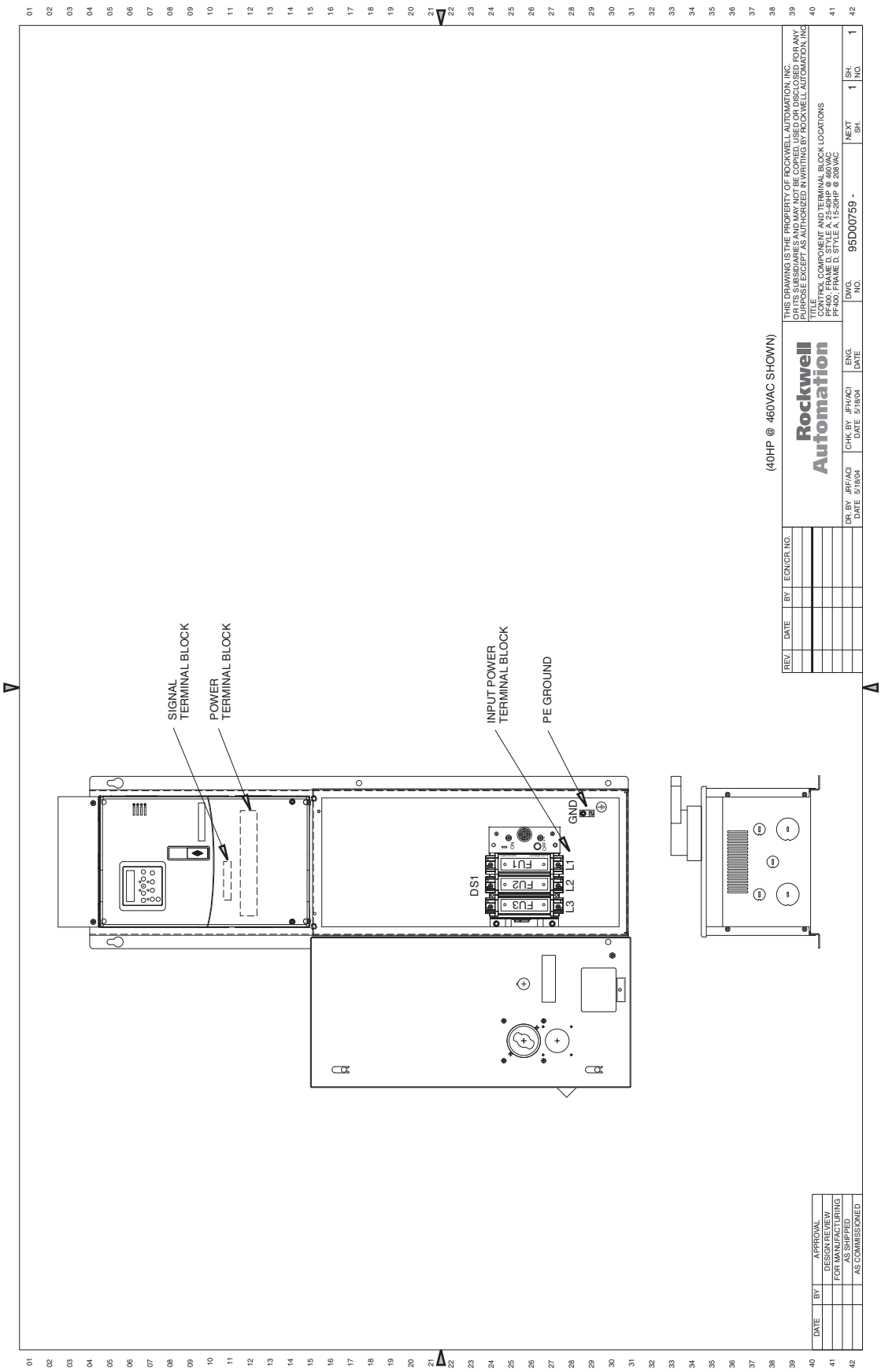


**Figure 1.15 25…30 Hp, 208V AC Drives - NEMA/UL Type 1**

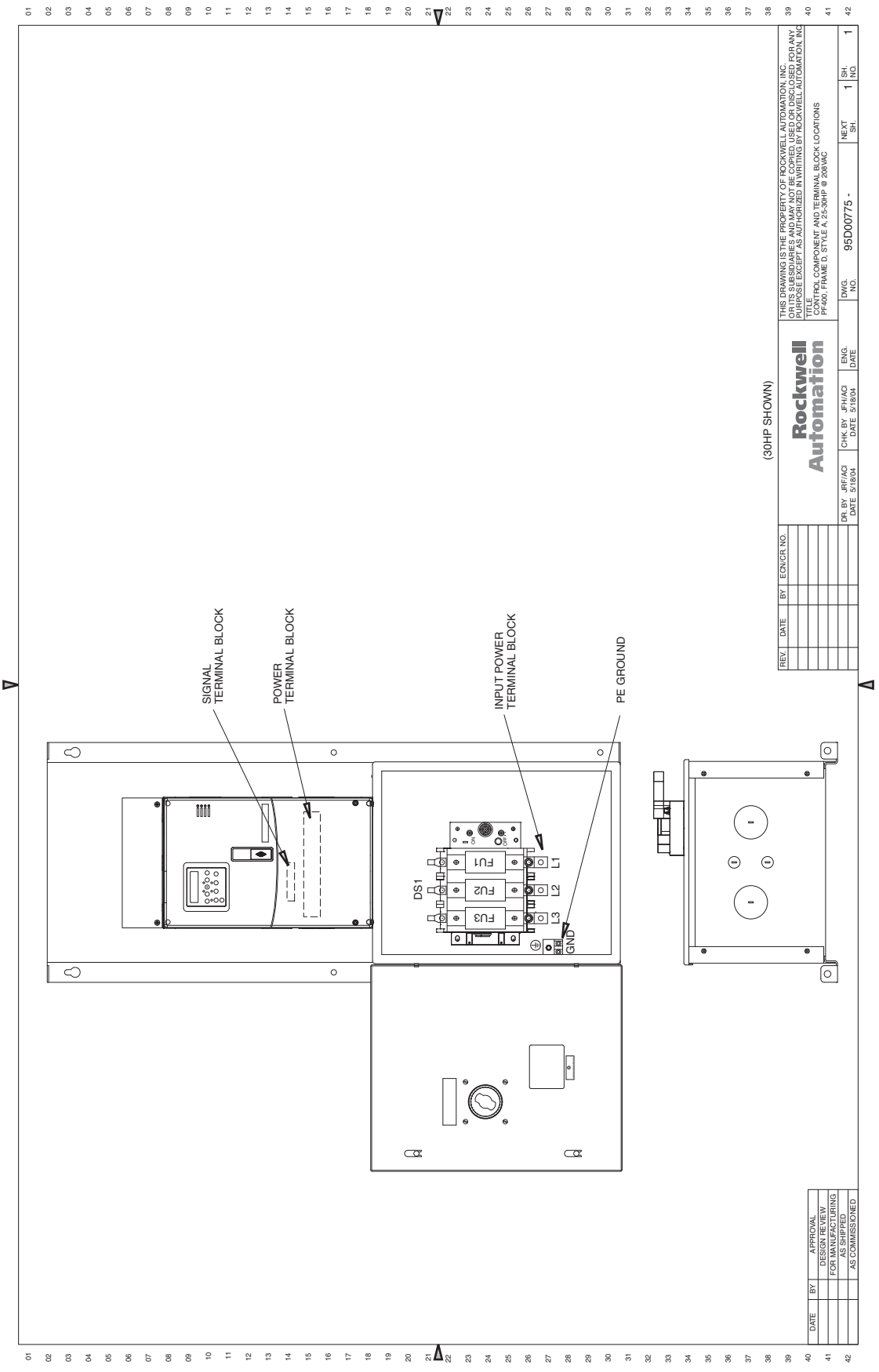


**Figure 1.16 40 Hp, 208V AC & 50...100 Hp, 460V AC Drives - NEMA/UL Type 1**

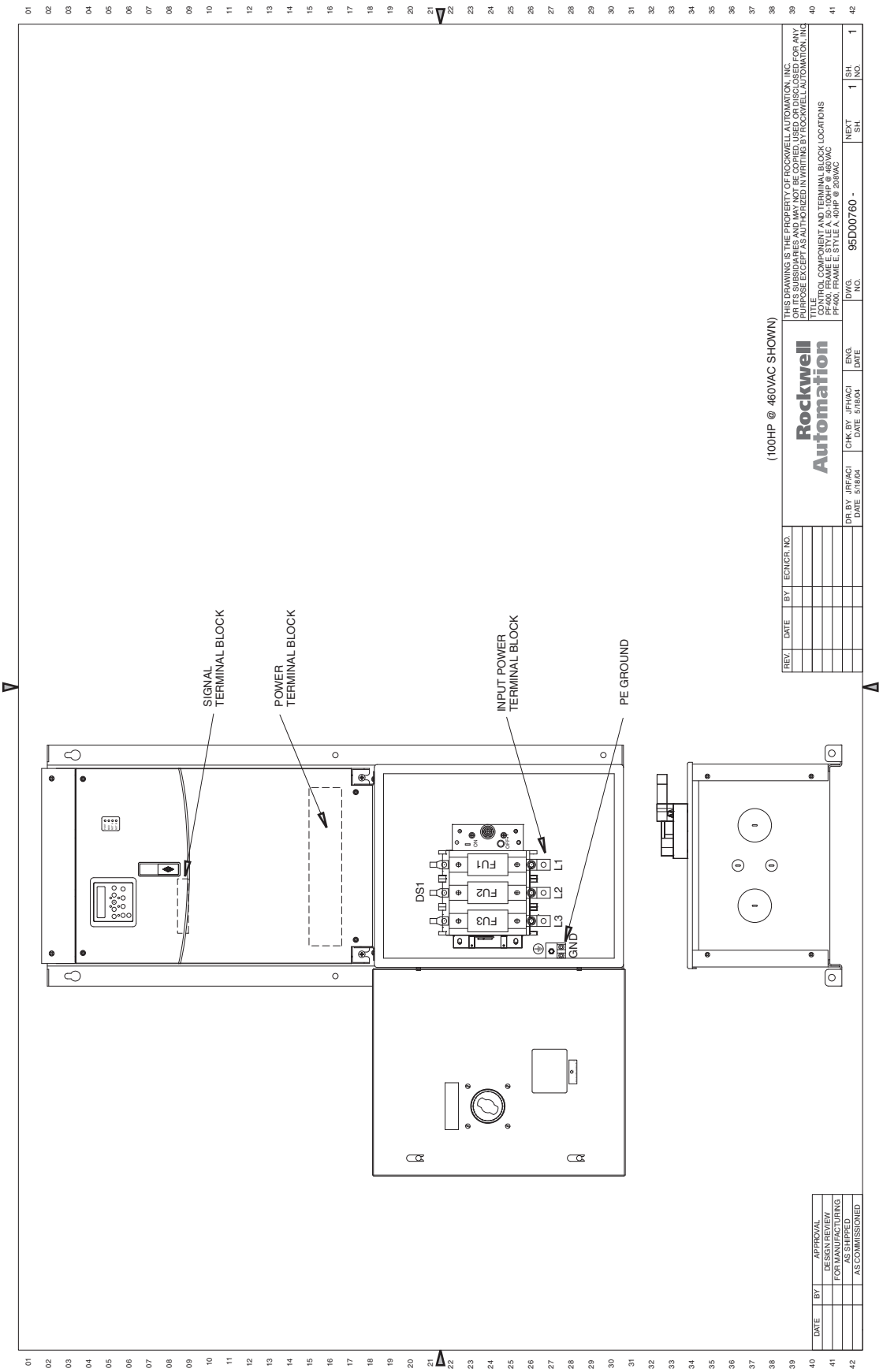


**Figure 1.17 50 Hp, 208V AC Drives - NEMA/UL Type 1**

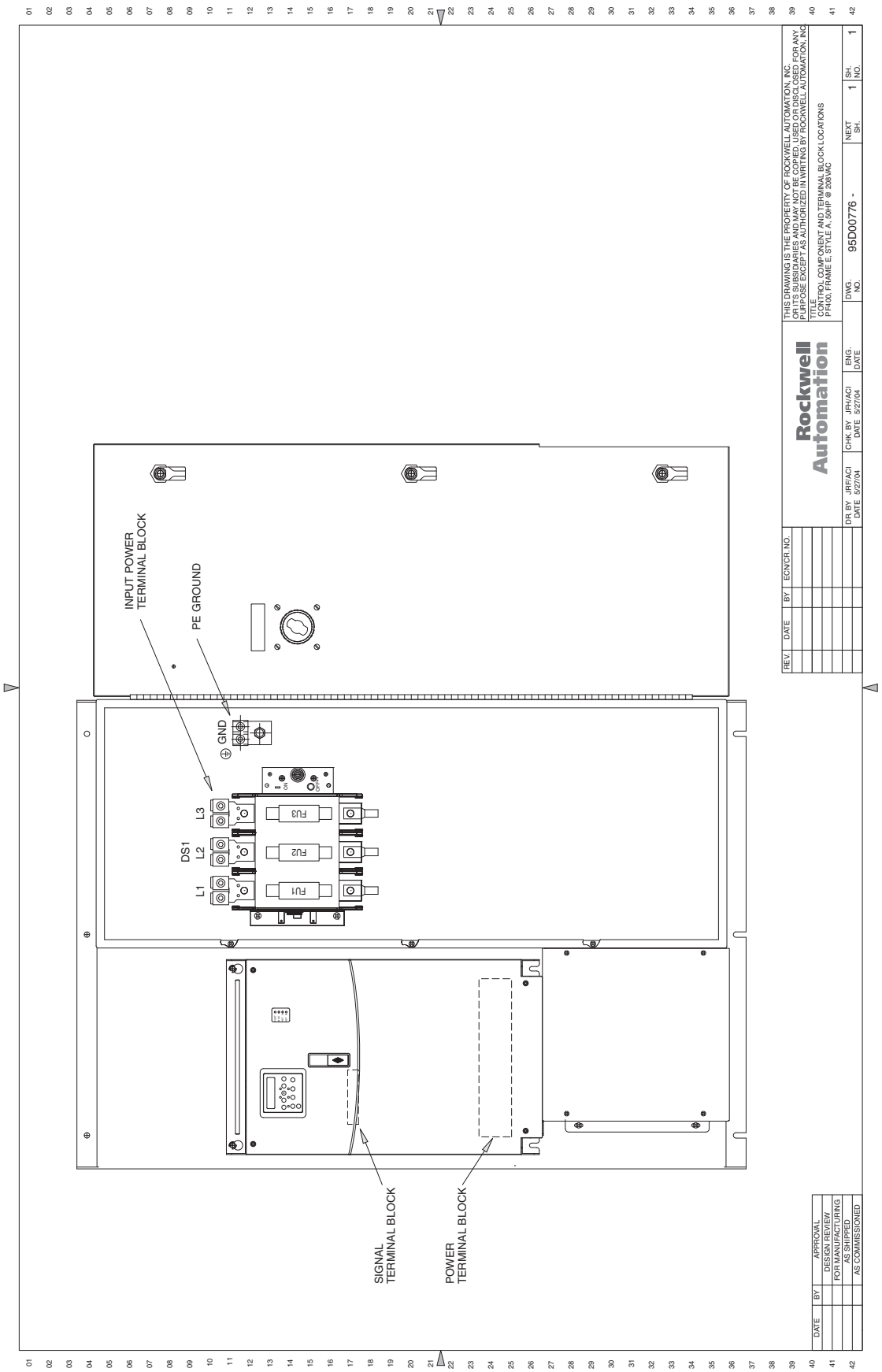


**Figure 1.18 125…150 Hp, 460V AC Drives - NEMA/UL Type 1**

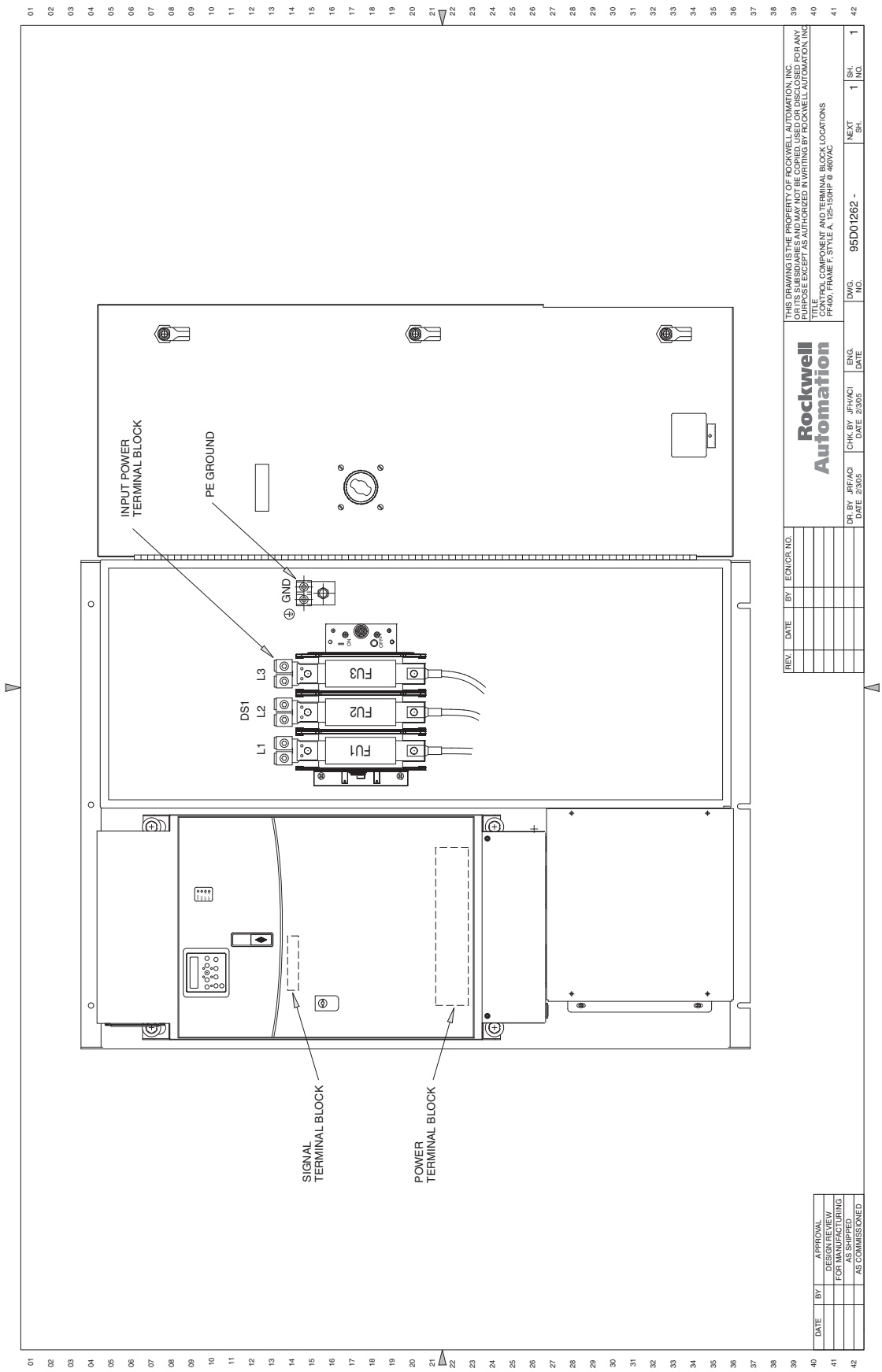


**Figure 1.19 200…250 Hp, 460V AC Drives - NEMA/UL Type 1**

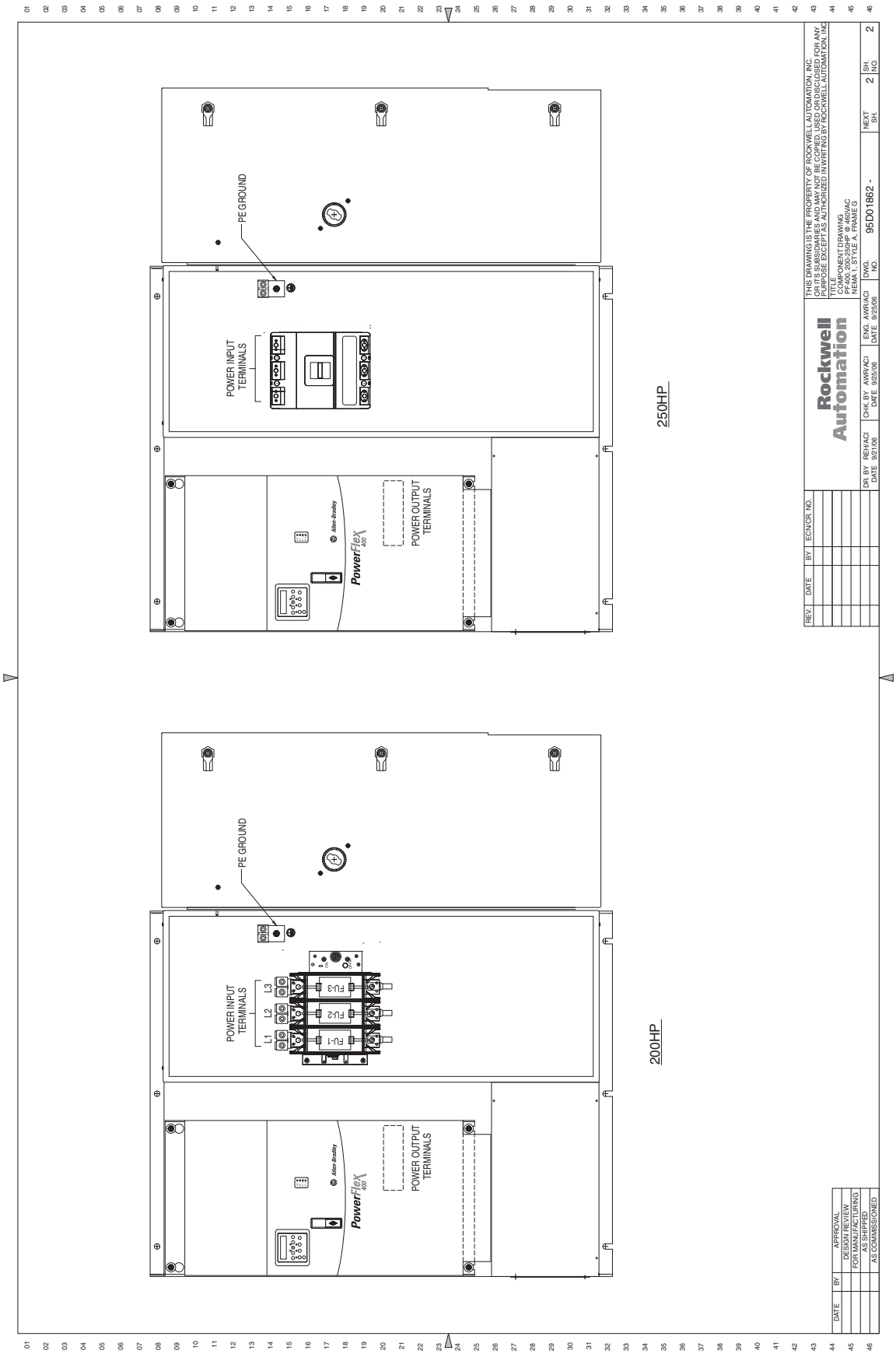
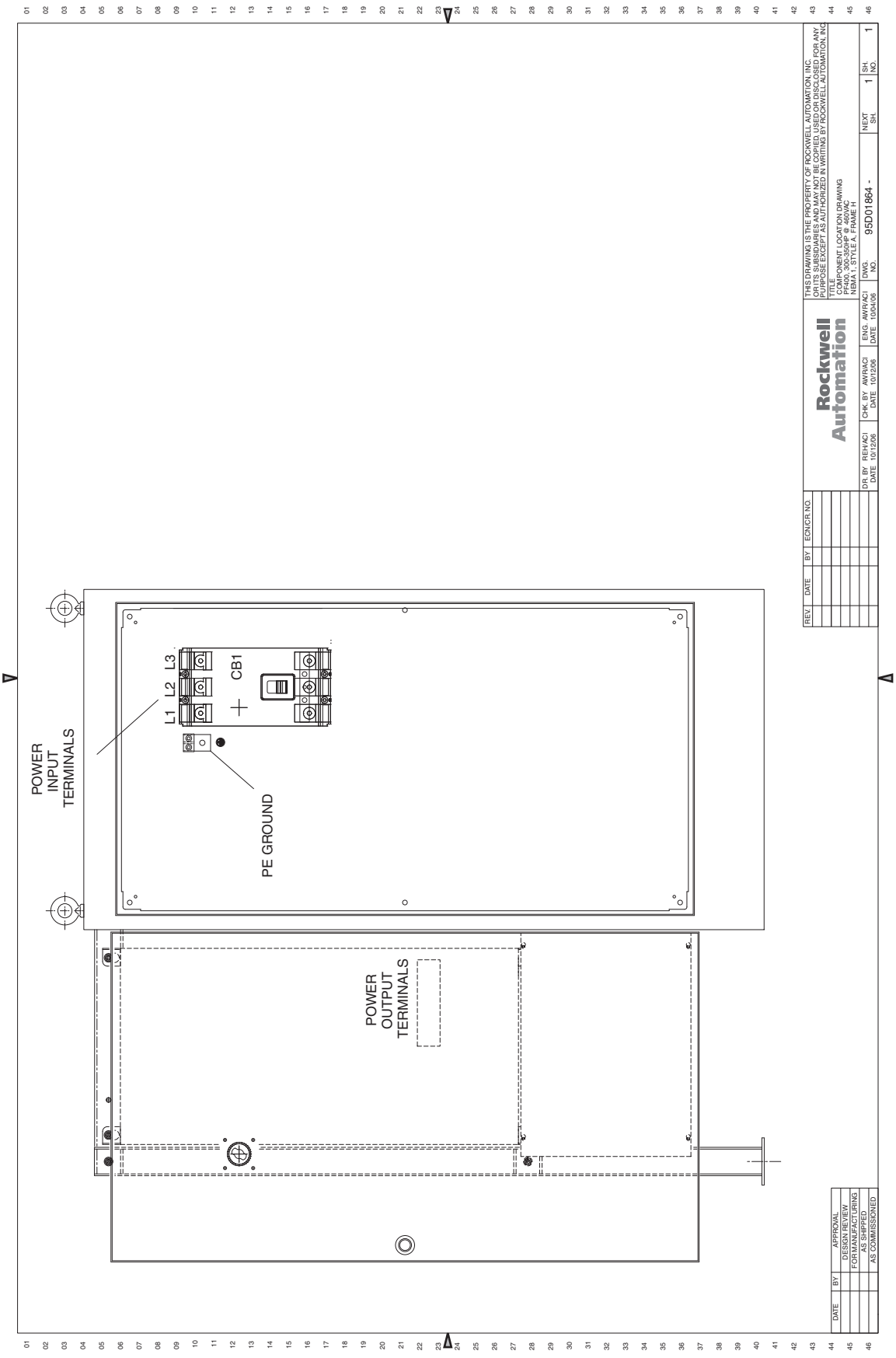


**Figure 1.20 300…350 Hp, 460V AC Drives - NEMA/UL Type 1**


POWER INPUT TERMINALS
L1 L2 L3
CB1
PE GROUND
POWER OUTPUT TERMINALS
Rockwell Automation
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TITLE
COMPONENT LOCATION DRAWING
PF700, 300-350HP @ 460VAC
NEMA 1 STYLE A, FRAME H
DWG. NO. 95D01864 -
NEXT SH.
SH. NO. 1
REV. DATE BY ECN/CR NO.
DR. BY REH/ACI DATE 10/12/06
CHK. BY AWR/ACI DATE 10/12/06
ENG. AWR/ACI DATE 10/04/06
APPROVAL
DESIGN REVIEW
FOR MANUFACTURING
AS SHIPPED
AS COMMISSIONED

**Figure 1.21 3.0…5.0 Hp, 208V AC & 3.0…10 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1**

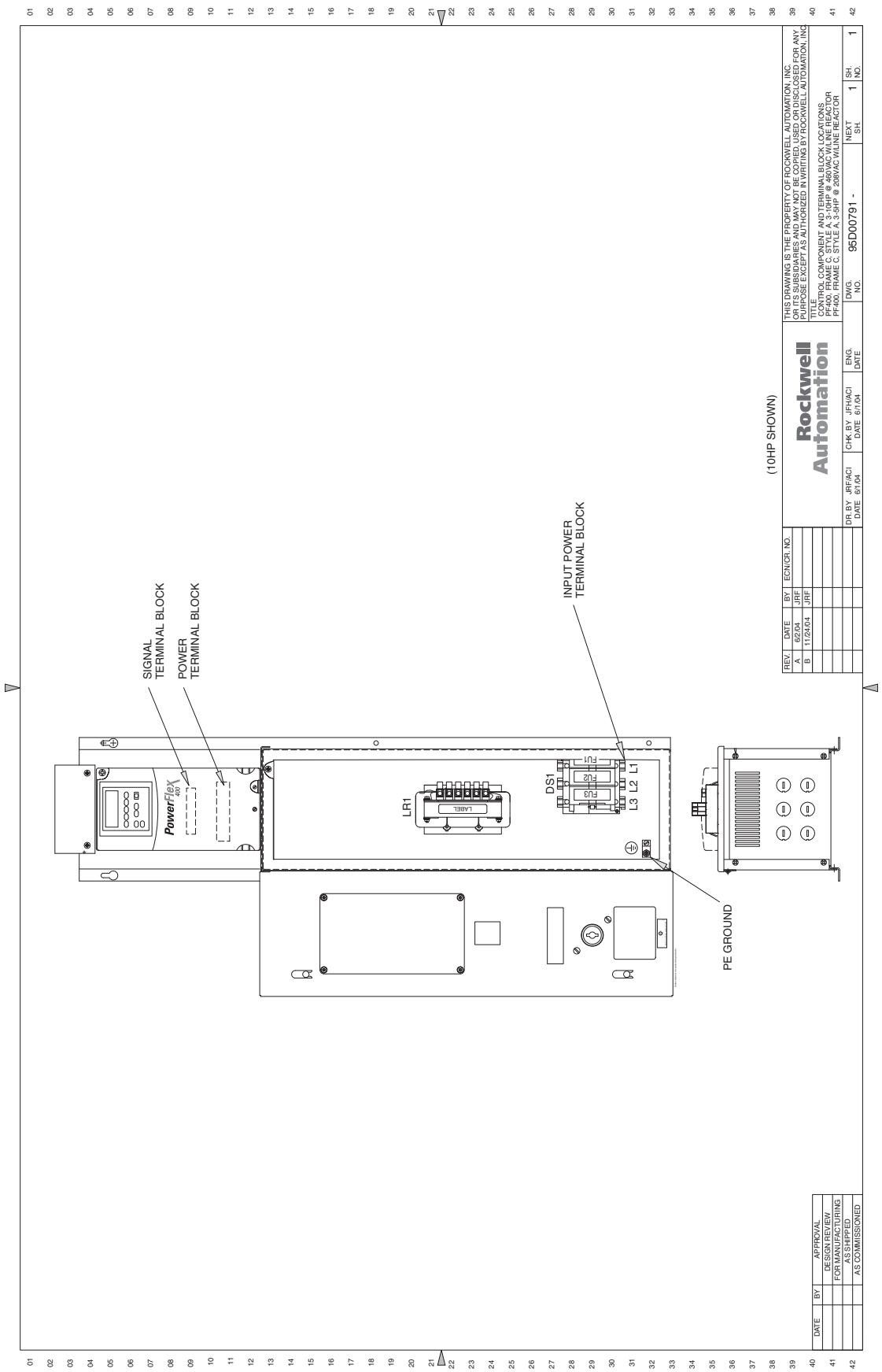

SIGNAL TERMINAL BLOCK
POWER TERMINAL BLOCK
INPUT POWER TERMINAL BLOCK
PE GROUND
LR1
DS1
L3 L2 L1
(10HP SHOWN)
THIS DRAWING IS THE PROPERTY OF ROCKWELL AUTOMATION, INC. OR ITS SUBSIDIARIES AND MAY NOT BE COPIED, USED OR DISCLOSED FOR ANY PURPOSE EXCEPT AS AUTHORIZED IN WRITING BY ROCKWELL AUTOMATION, INC.
TITLE
CONTROL COMPONENT AND TERMINAL BLOCK LOCATIONS
PF400, FRAME C, STYLE A, 3-10HP @ 460VAC W/LINE REACTOR
PF400, FRAME C, STYLE A, 3-5HP @ 208VAC W/LINE REACTOR
DWG. NO. 95D00791 -
NEXT SH.
SH. NO. 1
Rockwell Automation
DR. BY JRF/ACI DATE 6/1/04
CHK. BY JFH/ACI DATE 6/1/04
ENG. DATE
REV. DATE BY ECN/CR. NO.
A 6/2/04 JRF
B 11/24/04 JRF
APPROVAL
DESIGN REVIEW
FOR MANUFACTURING
AS SHIPPED
AS COMMISSIONED

**Figure 1.22 7.5…10 Hp, 208V AC & 15…20 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1**

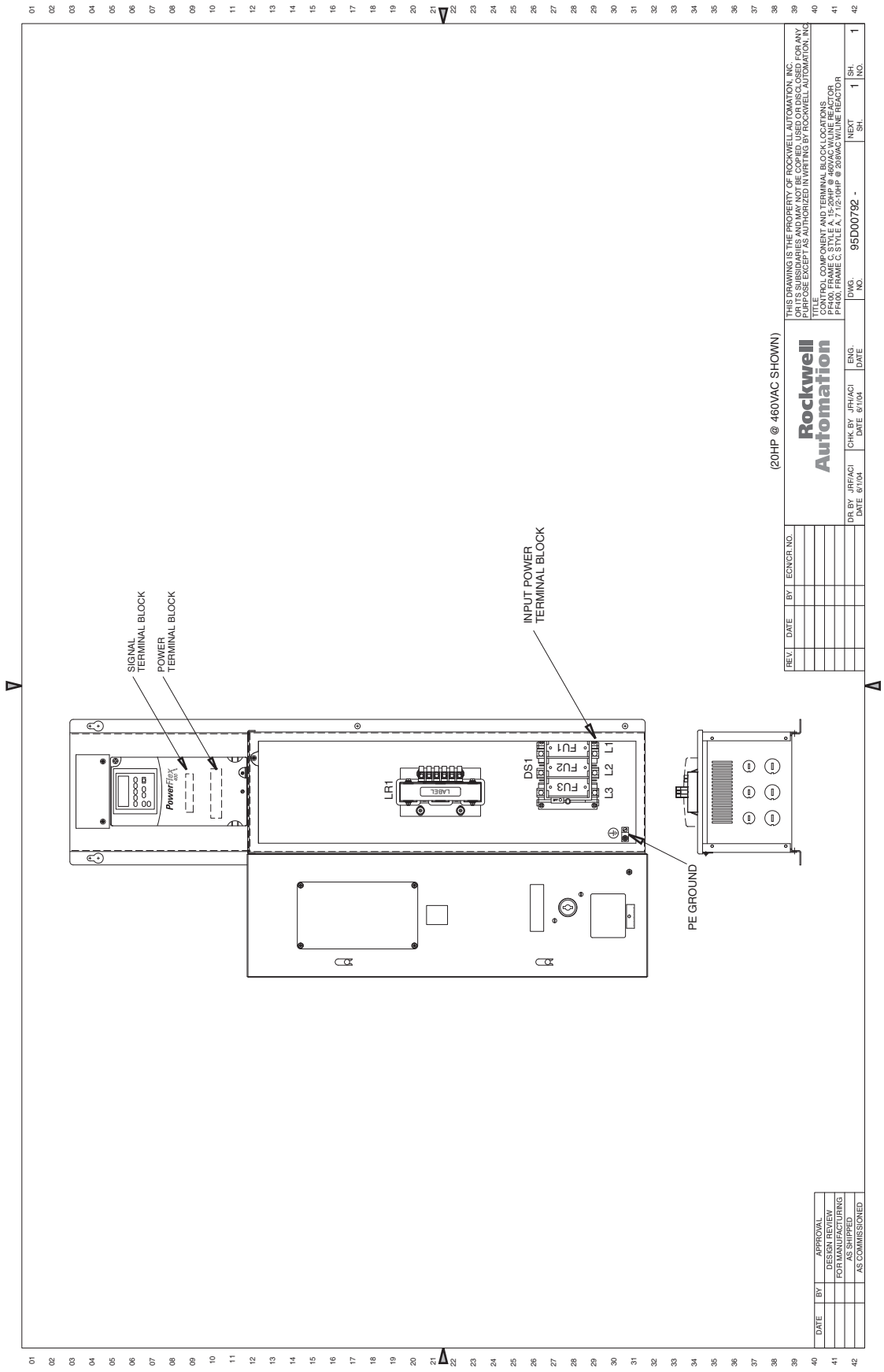


**Figure 1.23 15…20 Hp, 208V AC & 25…40 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1**

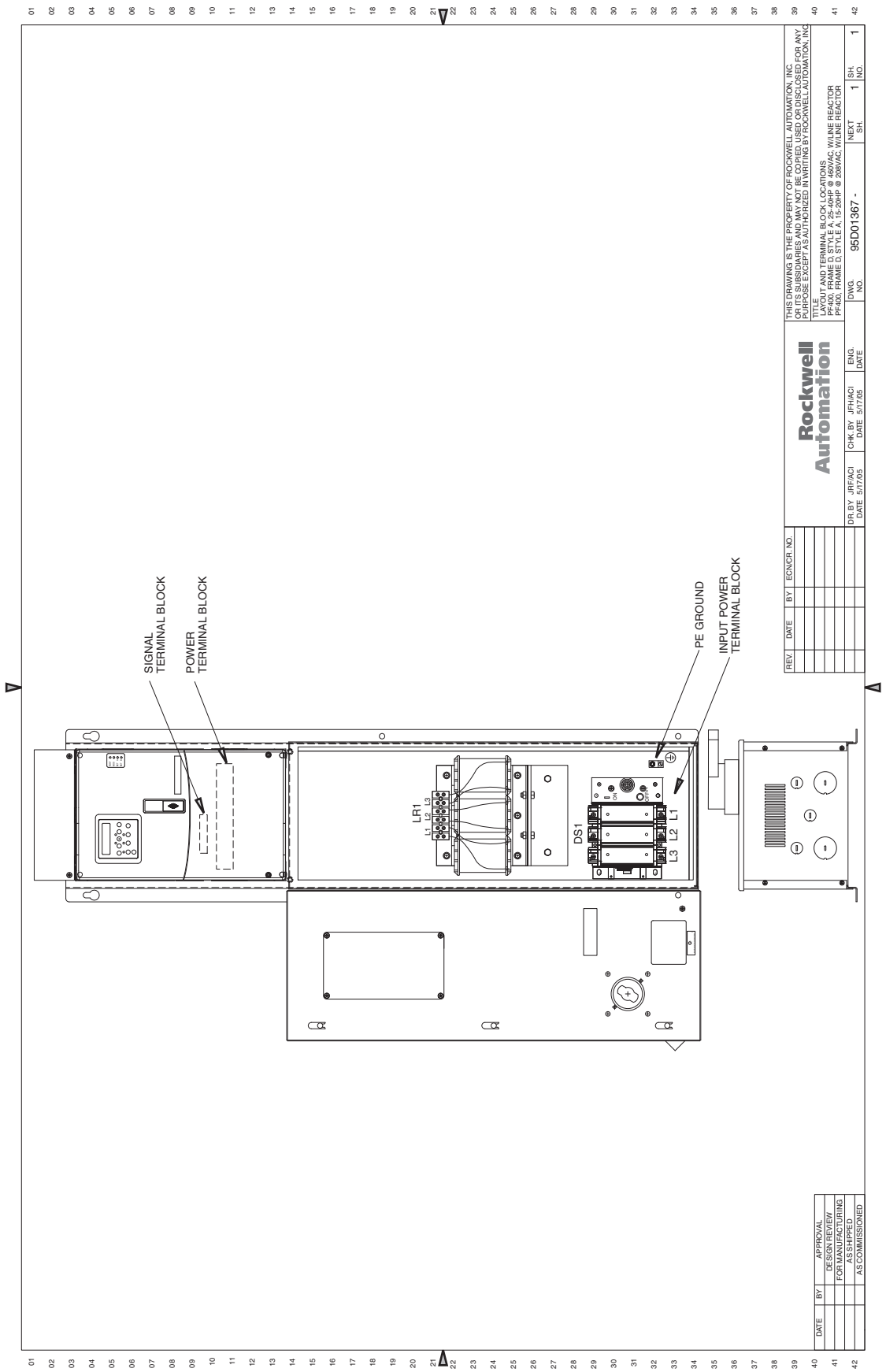

SIGNAL TERMINAL BLOCK
POWER TERMINAL BLOCK
PE GROUND
INPUT POWER TERMINAL BLOCK
LR1
DS1
L1
L2
L3
THIS DRAWING IS THE PROPERTY OF ROCKWELL AUTOMATION, INC. OR ITS SUBSIDIARIES AND MAY NOT BE COPIED, USED OR DISCLOSED FOR ANY PURPOSE EXCEPT AS AUTHORIZED IN WRITING BY ROCKWELL AUTOMATION, INC.
TITLE
LAYOUT AND TERMINAL BLOCK LOCATIONS
PF400, FRAME D, STYLE A, 25-40HP @ 460VAC, W/LINE REACTOR
PF400, FRAME D, STYLE A, 15-20HP @ 208VAC, W/LINE REACTOR
DWG. NO. 95D01367 -
NEXT SH. 1
SH. NO. 1
Rockwell Automation
DR. BY JRF/ACI DATE 5/17/05
CHK. BY JFH/ACI DATE 5/17/05
ENG. DATE
REV. DATE BY ECN/CR. NO.
APPROVAL
DESIGN REVIEW
FOR MANUFACTURING
AS SHIPPED
AS COMMISSIONED

**Figure 1.24 25…30 Hp, 208V AC Drives with Line Reactor - NEMA/UL Type 1**

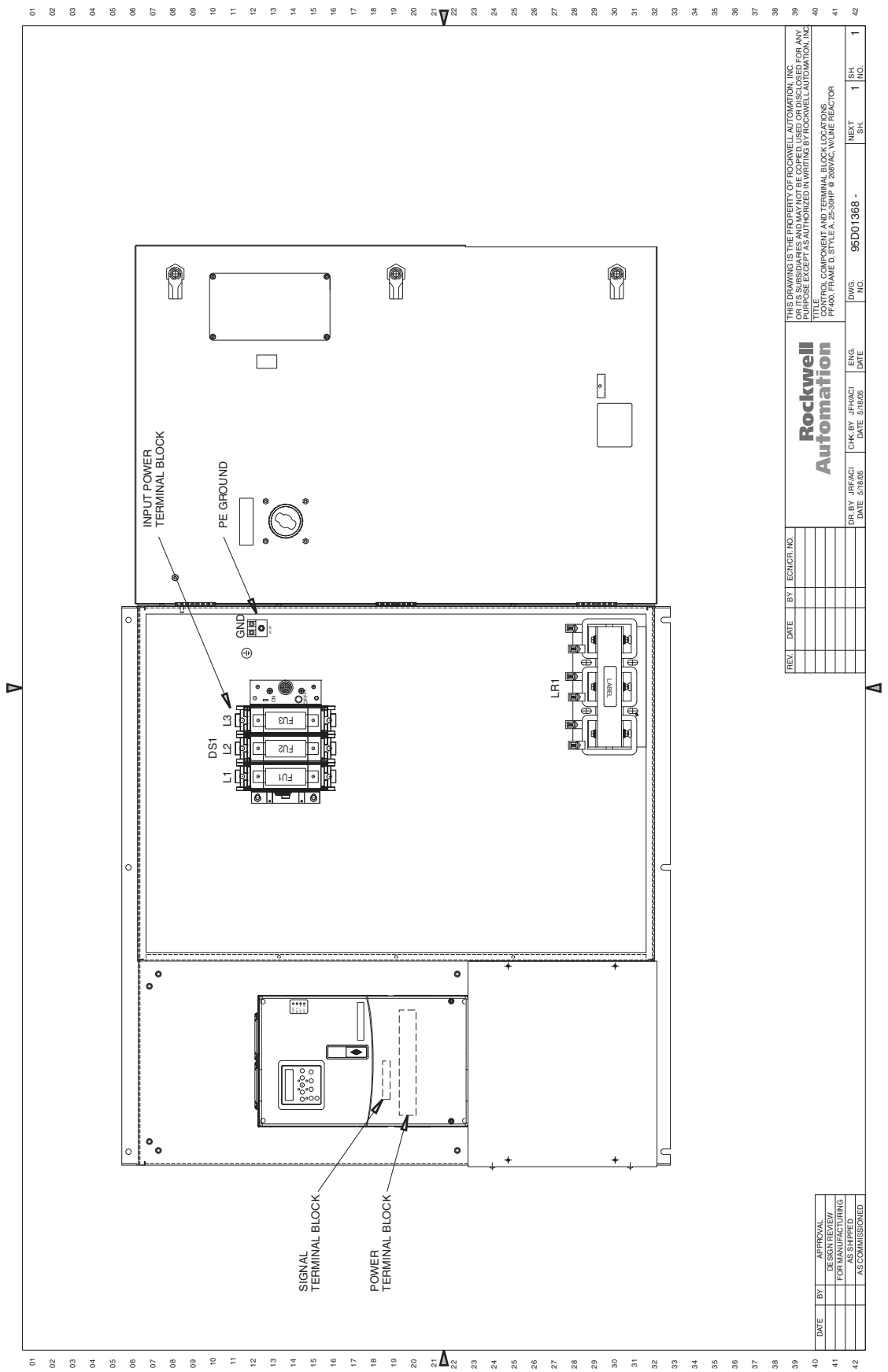


**Figure 1.25 40…50 Hp, 208V AC & 50…100 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1**

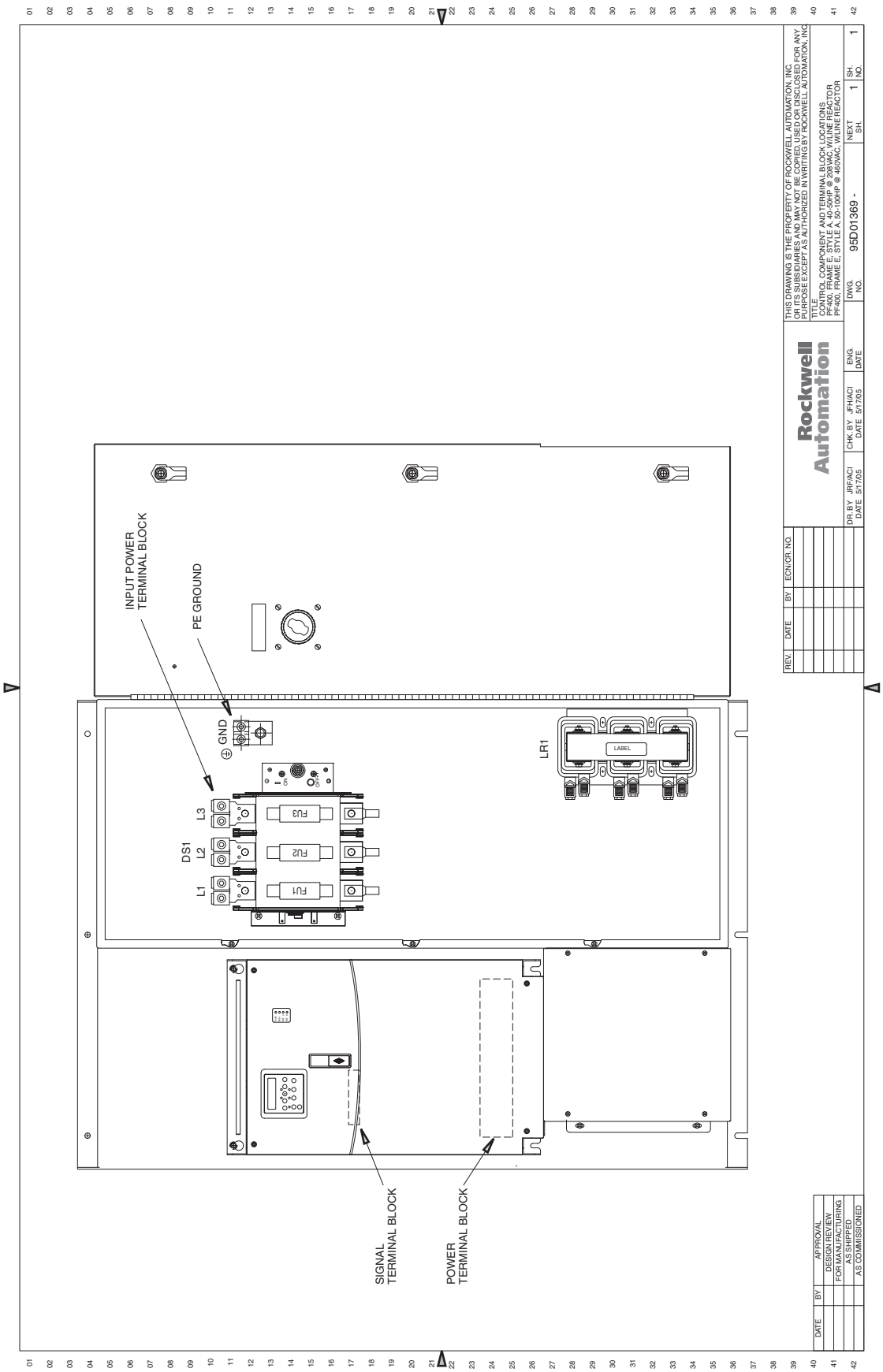


**Figure 1.26 125…150 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1**

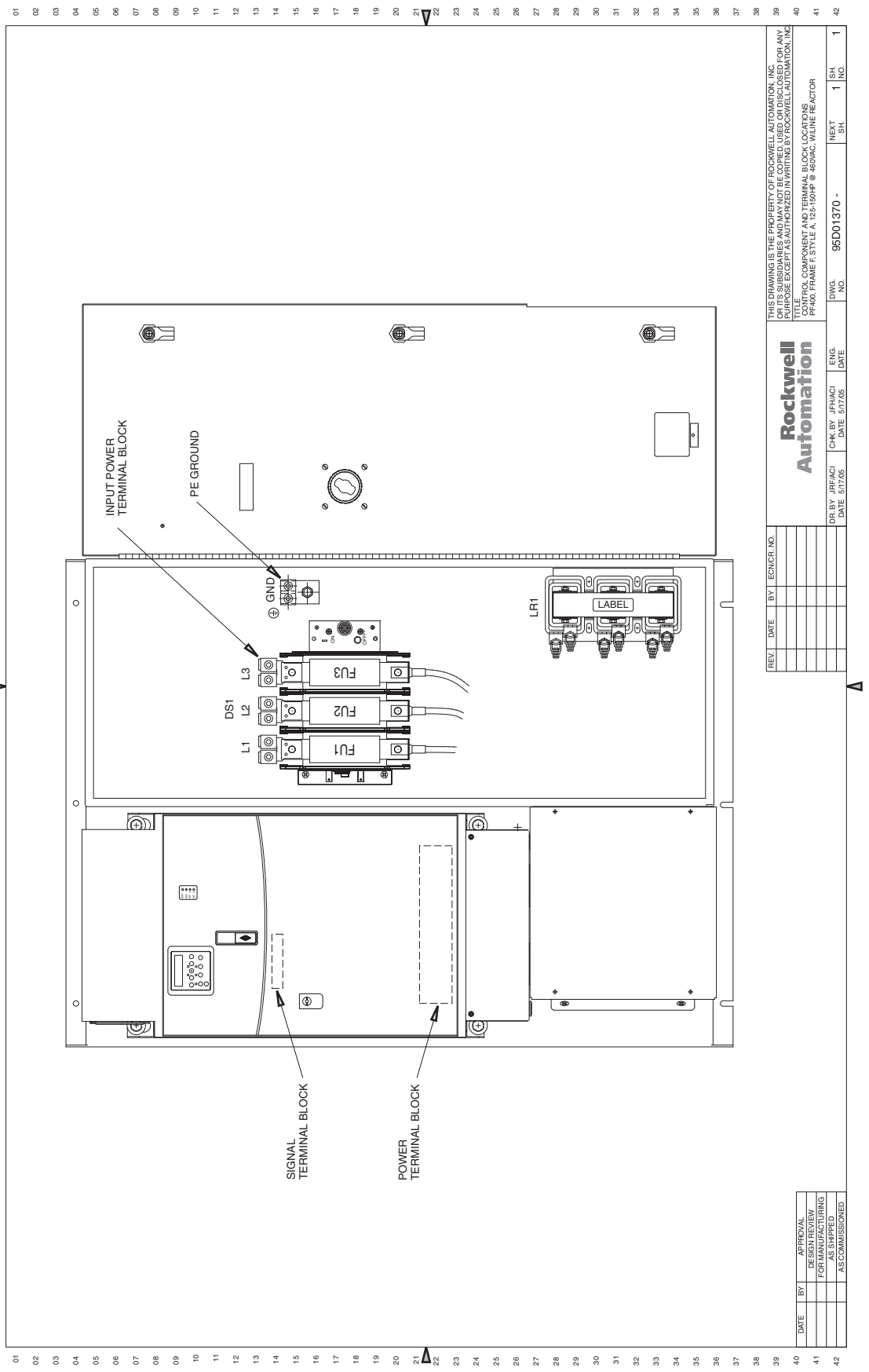


**Figure 1.27 3.0…10 Hp, 208V & 3.0…20 Hp, 460V AC Drives - NEMA/UL Type 12**

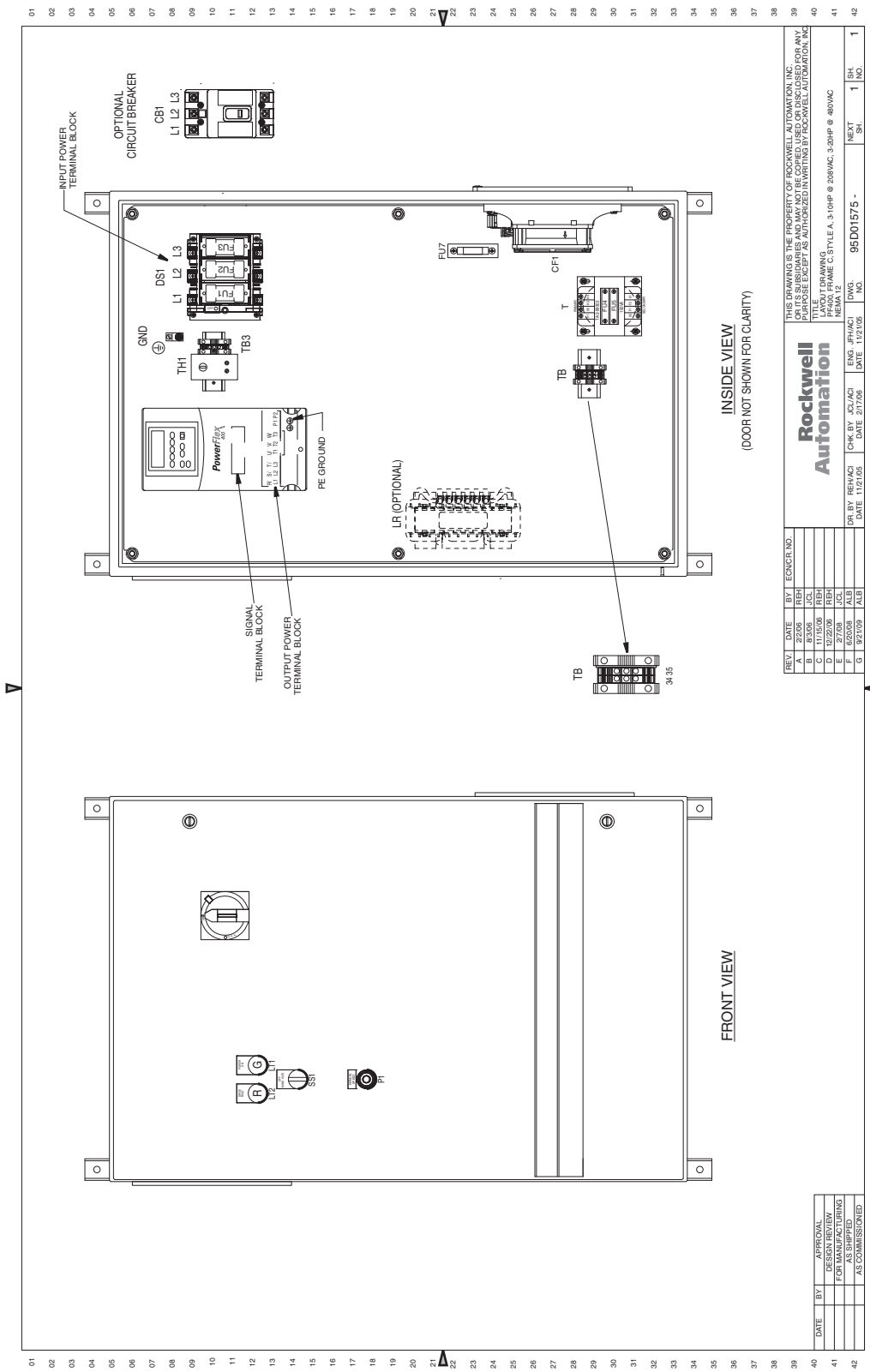


**Figure 1.28 15…20 Hp, 208V AC & 25…40 Hp 460V AC Drives - NEMA/UL Type 12**

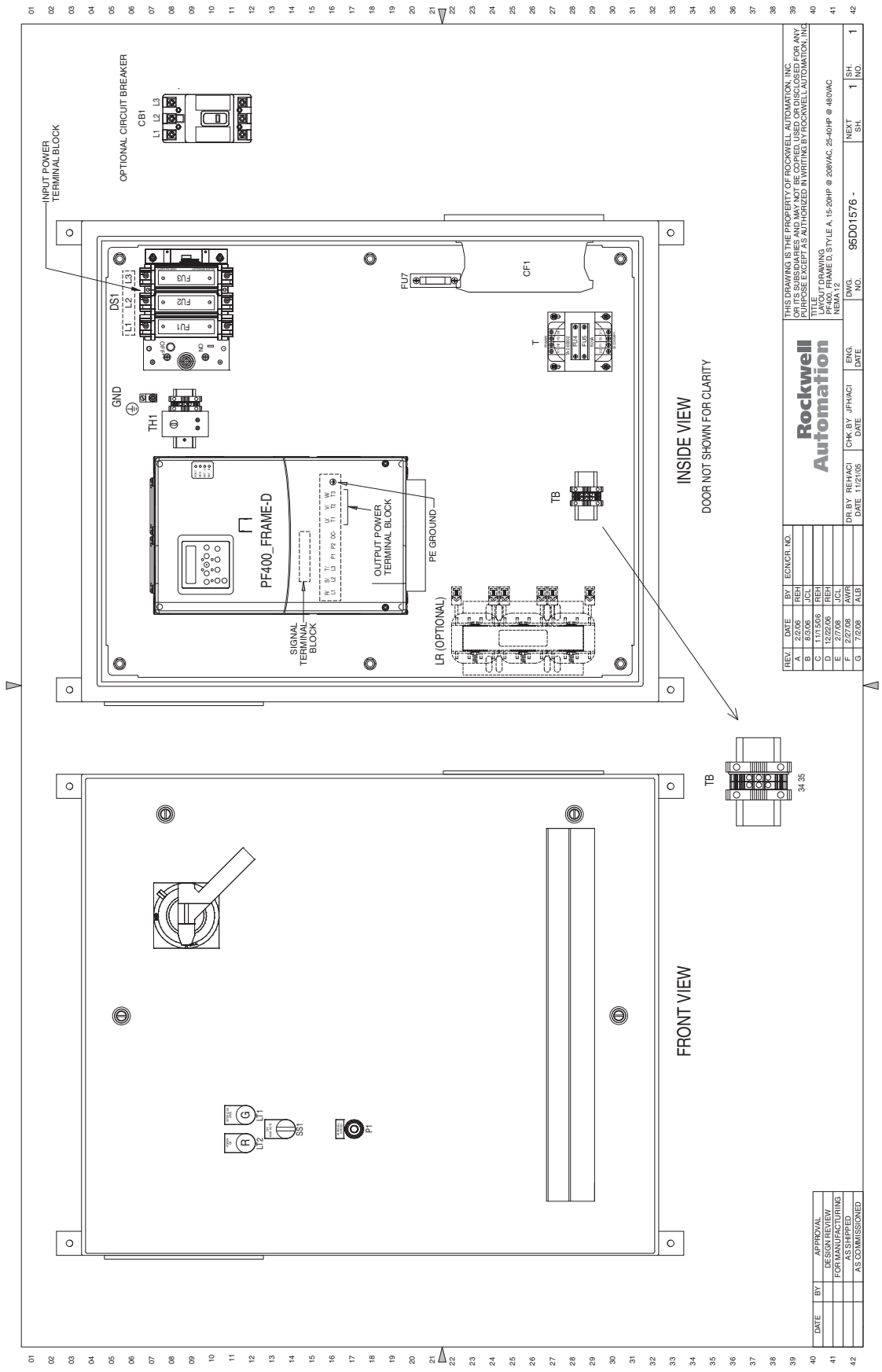


**Figure 1.29 50...60 Hp, 460V AC Drives - NEMA/UL Type 12**

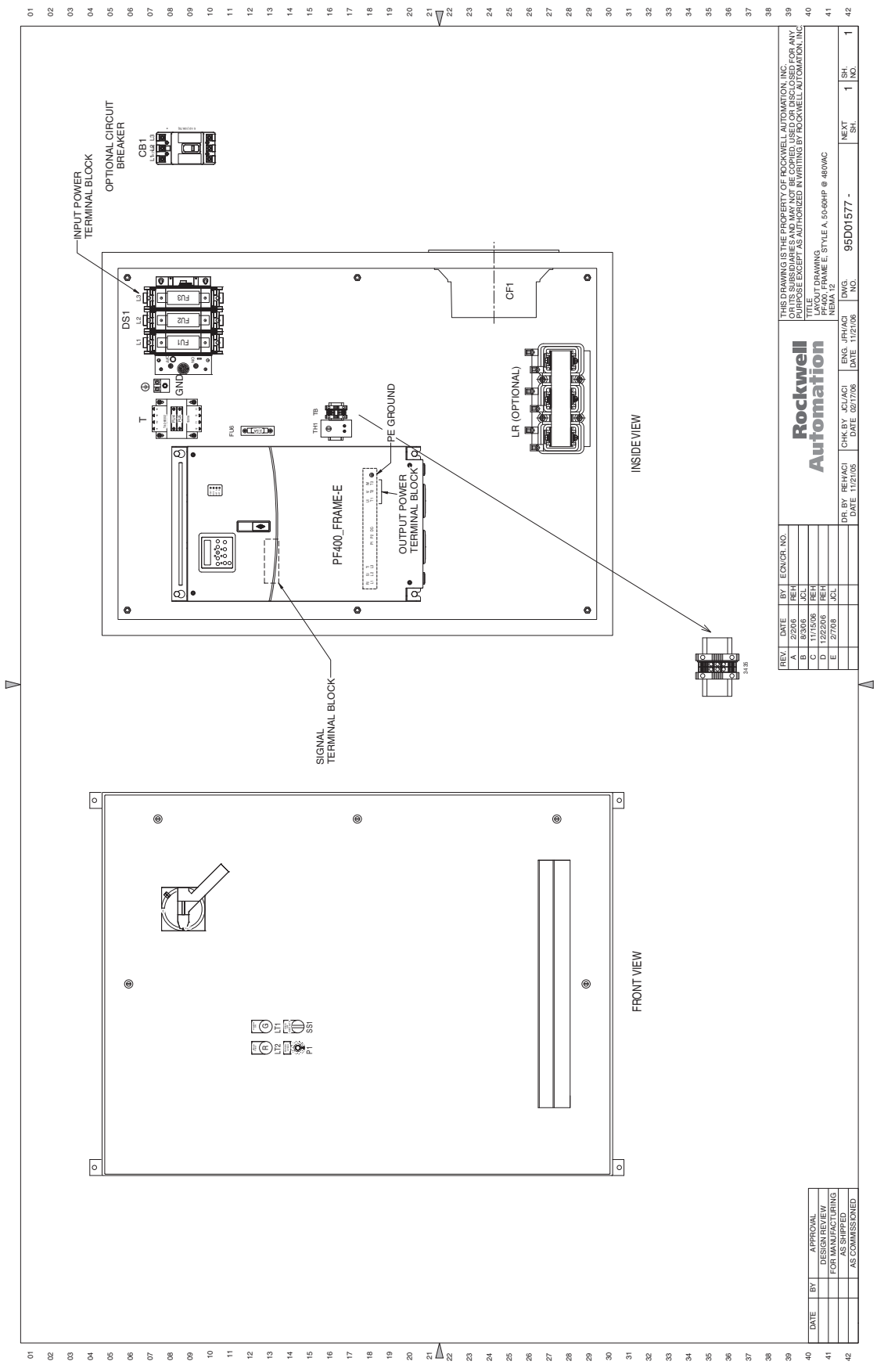


**Figure 1.30 40…50 Hp, 208V AC & 75…100 Hp, 460V AC Drives - NEMA/UL Type 12**

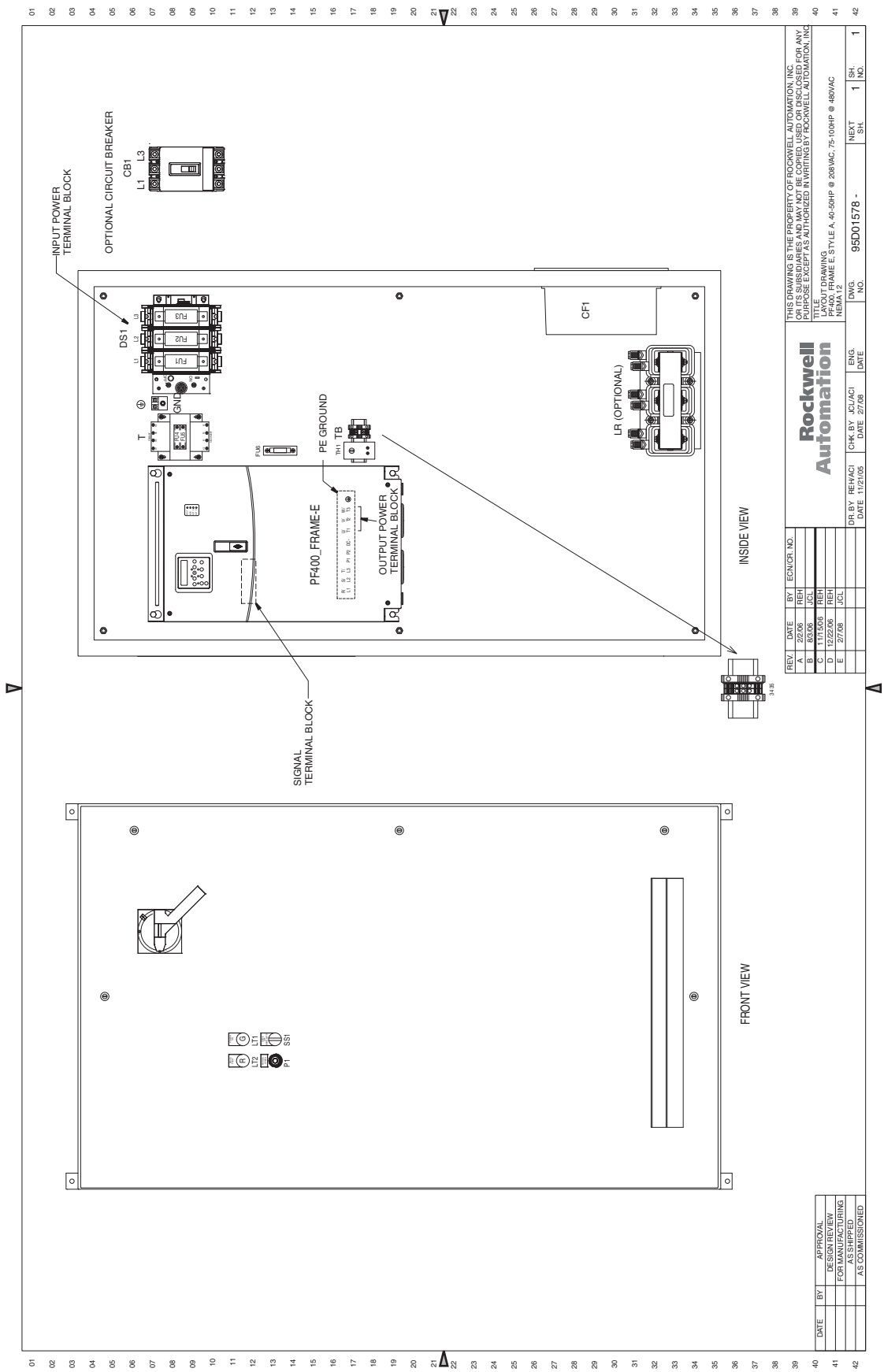


**Figure 1.31 125…150 Hp, 460V AC Drives - NEMA/UL Type 12**

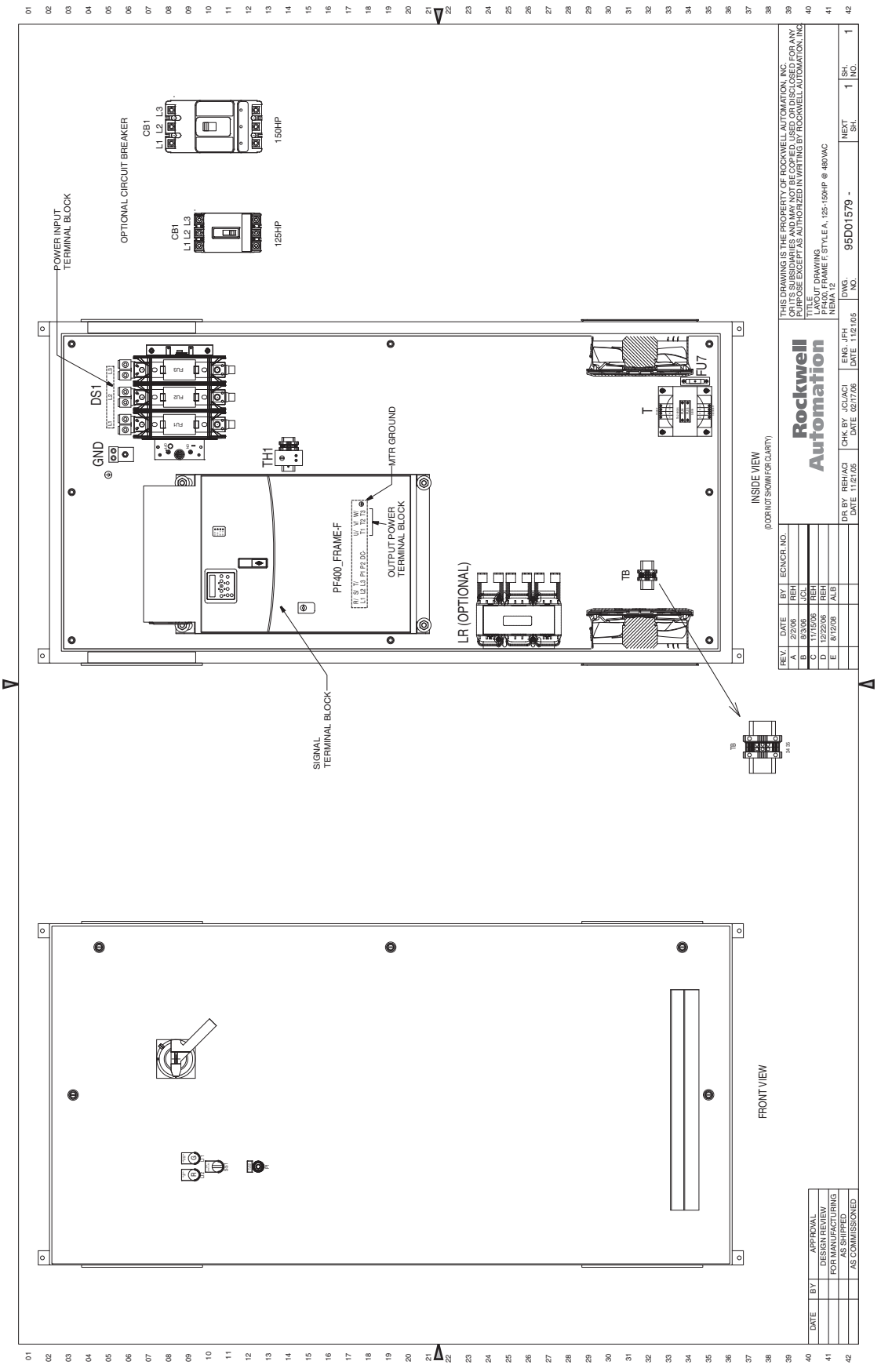


**Figure 1.32 3.0…5.0 Hp, 460V AC Drives - NEMA/UL Type 4**

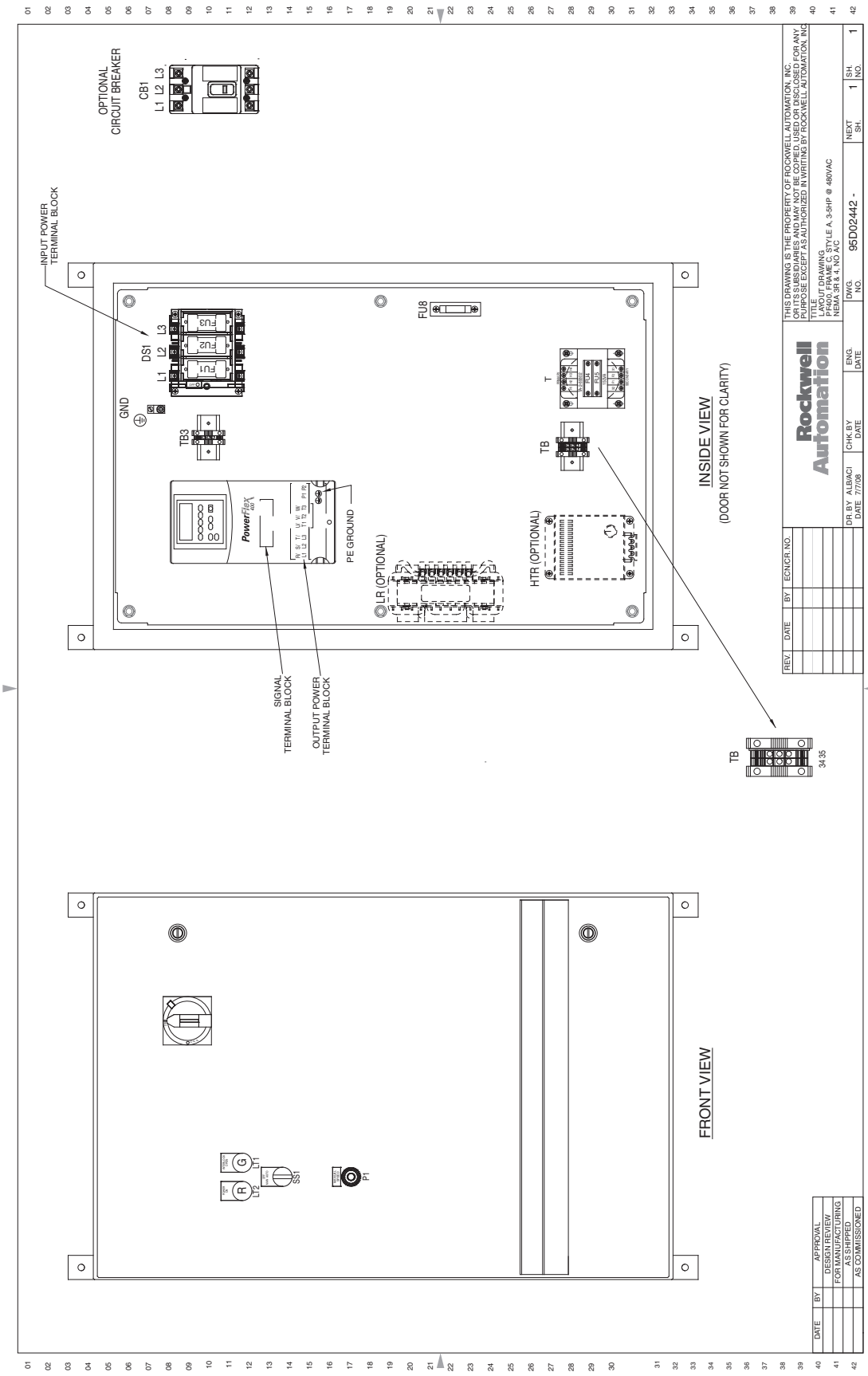


**Figure 1.33 5.0…10 Hp, 208V AC & 7.5…20 Hp, 460V AC Drives - NEMA/UL Type 4**

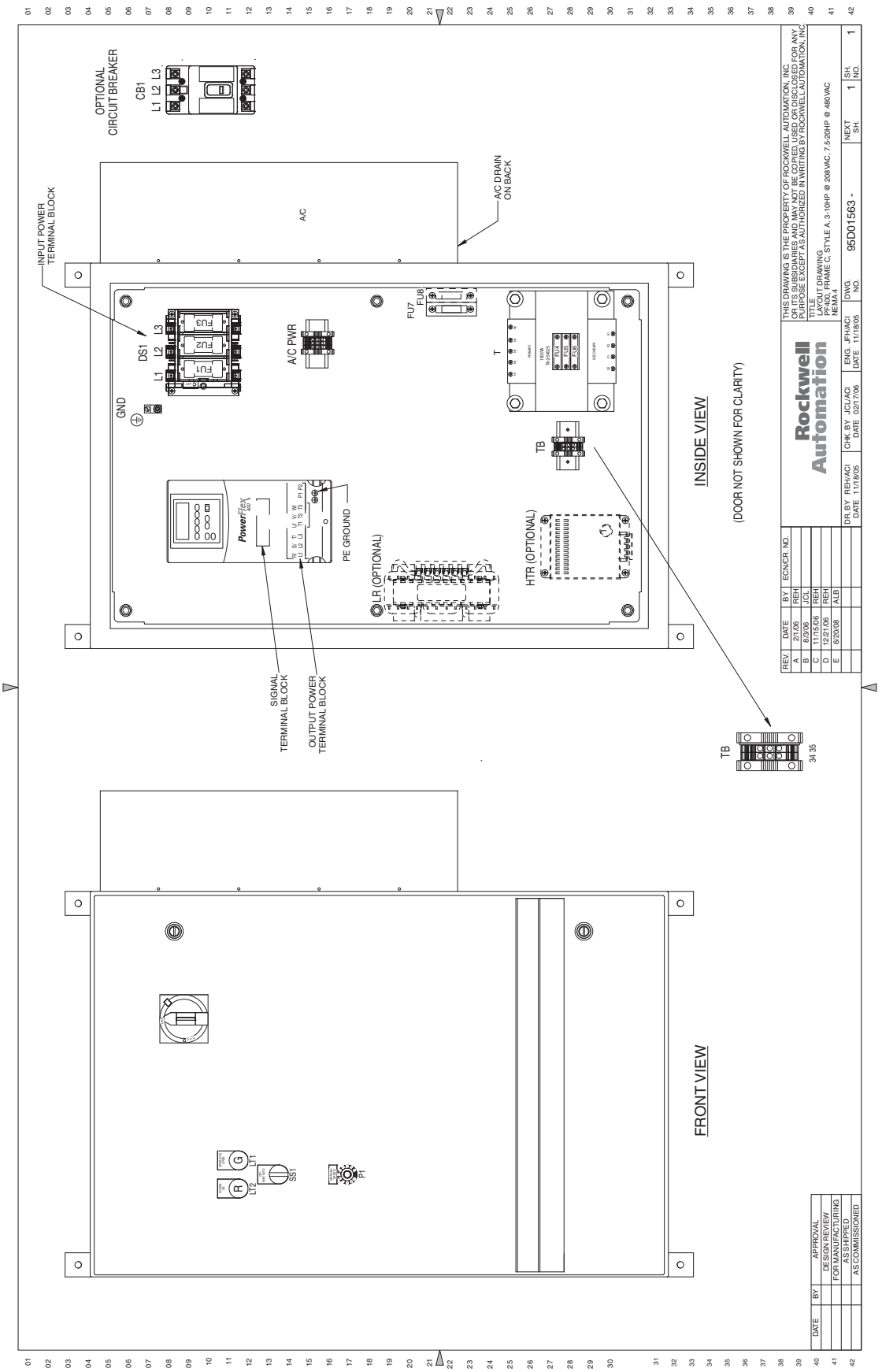


**Figure 1.34 15 Hp, 208V AC & 25 Hp, 460V AC Drives - NEMA/UL Type 4**

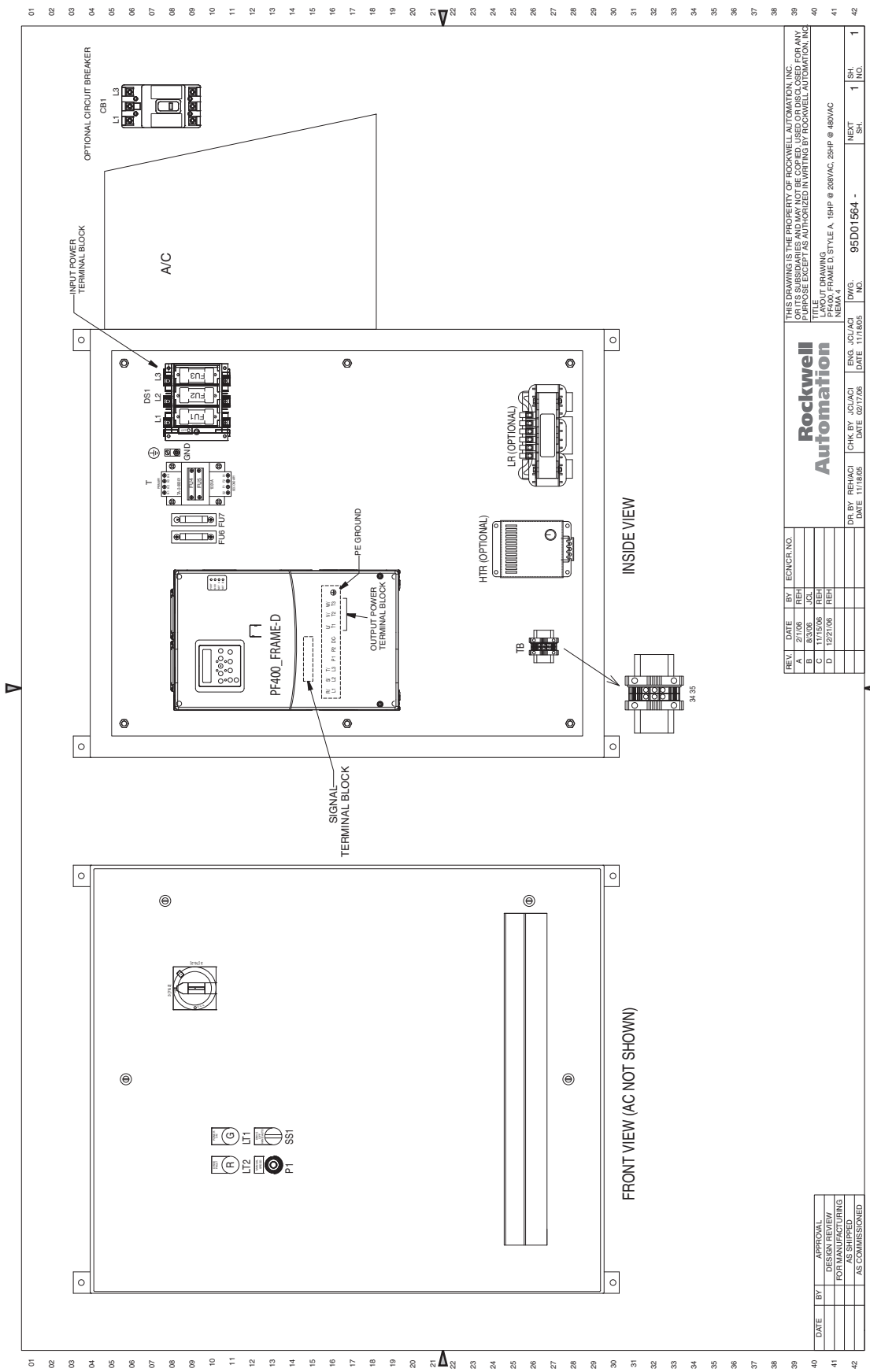


**Figure 1.35 15…20 Hp, 208V AC & 25…40 Hp, 460V AC Drives - NEMA/UL Type 4**

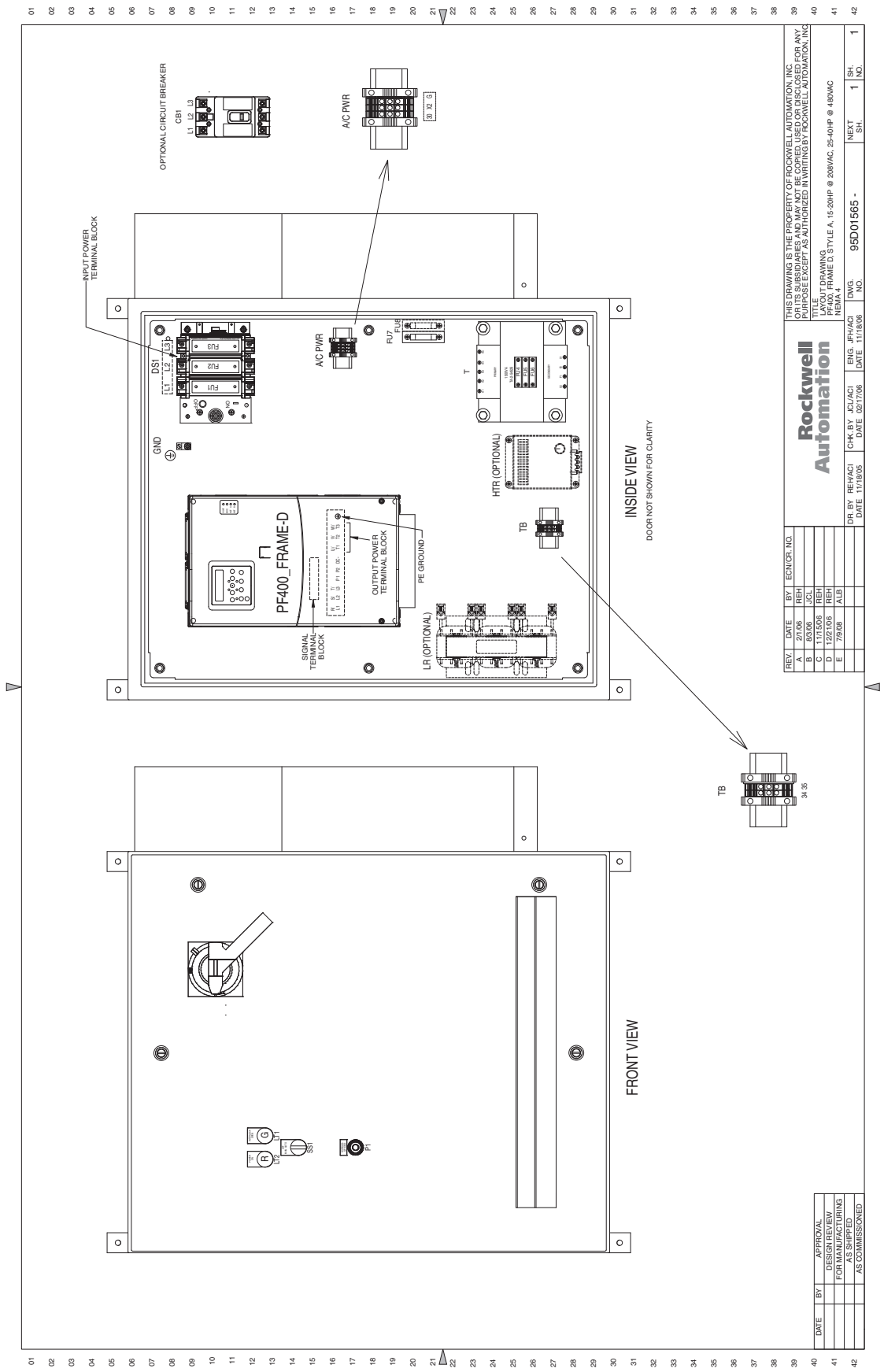


**Figure 1.36 25…30 Hp, 208V AC & 50…60 Hp, 460V AC Drives - NEMA/UL Type 4**

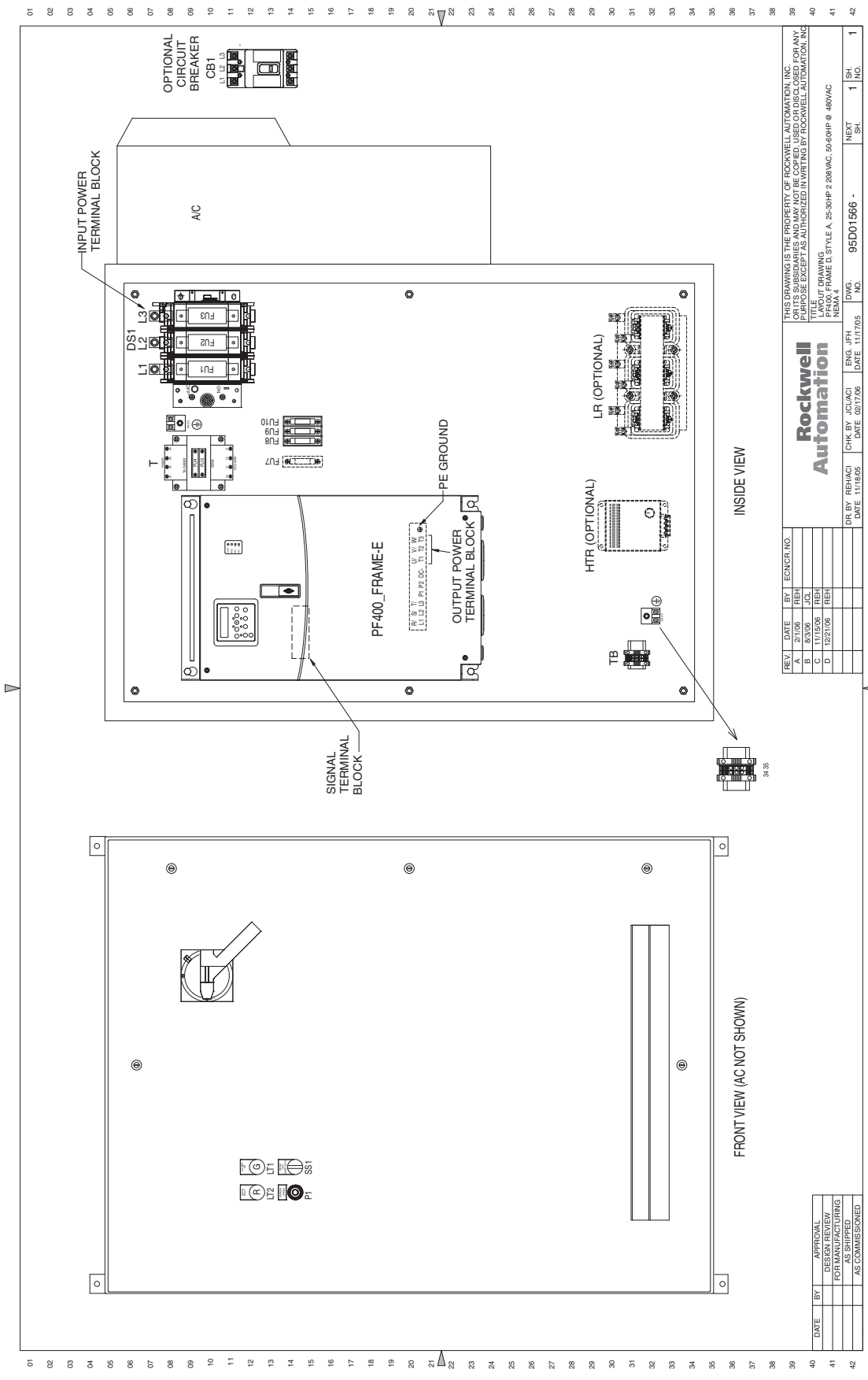


**Figure 1.37 40…50 Hp, 208V AC & 75…100 Hp, 460V AC Drives - NEMA/UL Type 4**

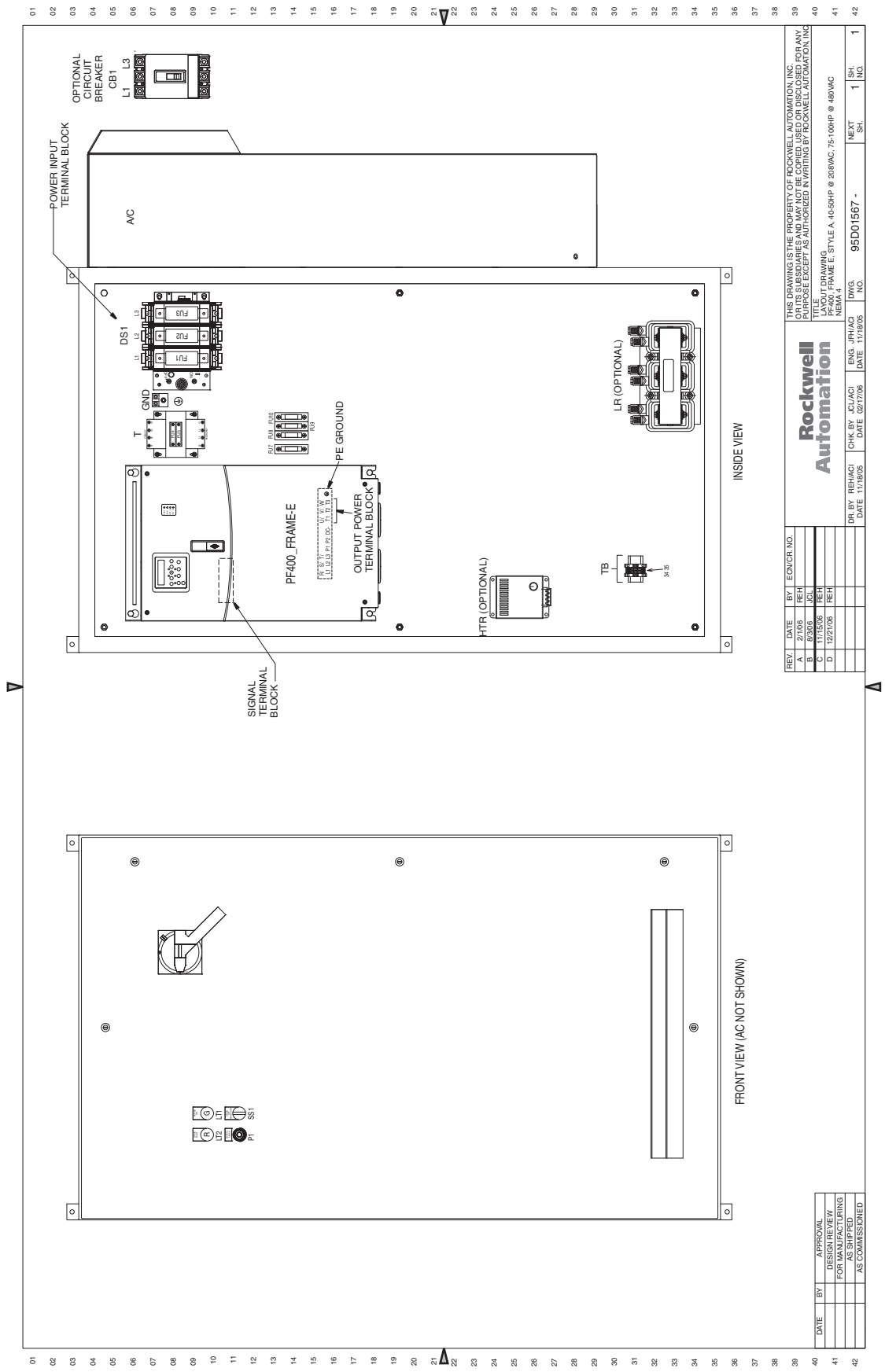


**Figure 1.38 125…150 Hp, 460V AC Drives - NEMA/UL Type 4**

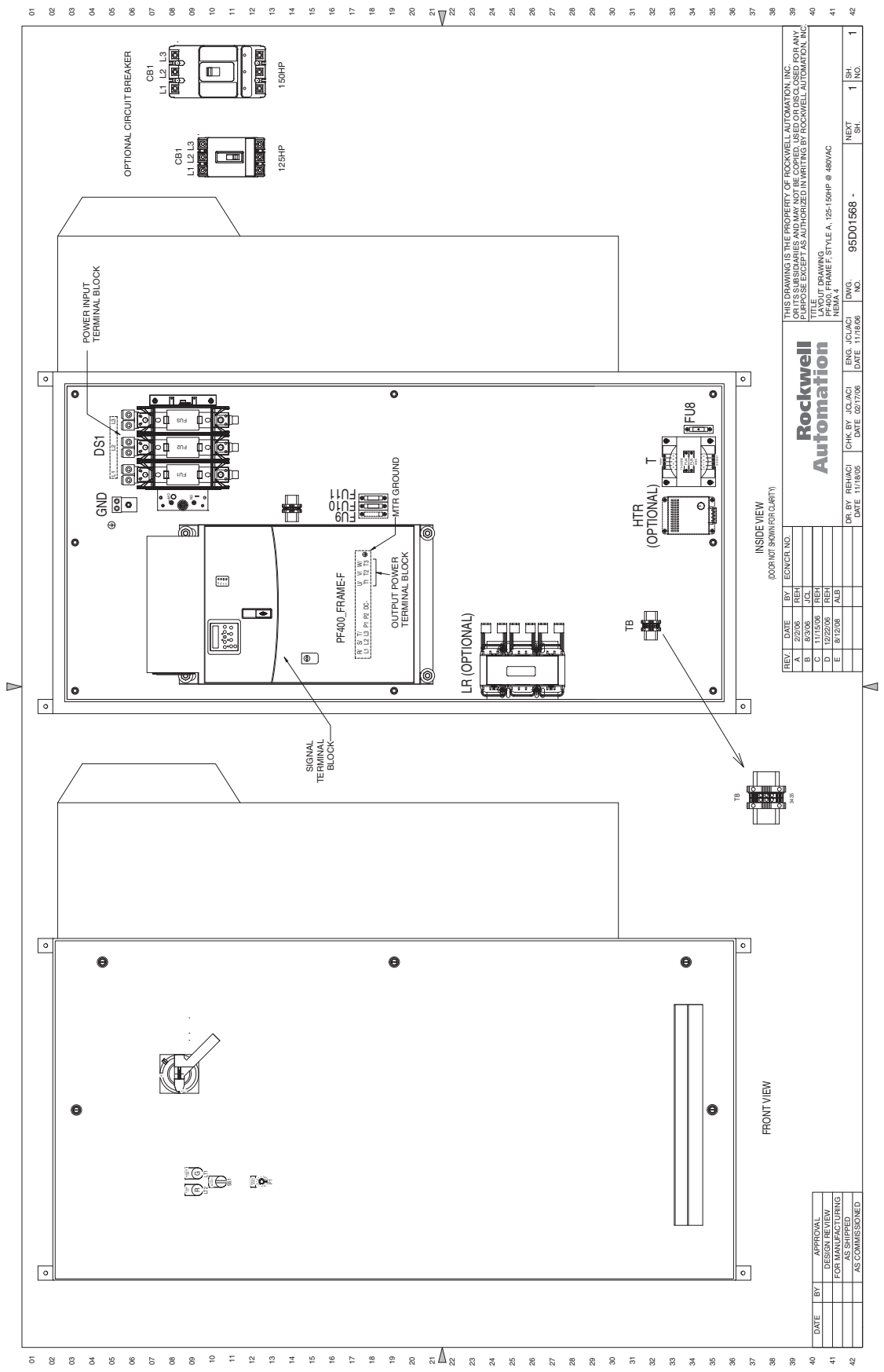


**Figure 1.39 3.0…10 Hp, 208V AC & 3.0…20 Hp, 460V AC Drives - NEMA/UL Type 3R**

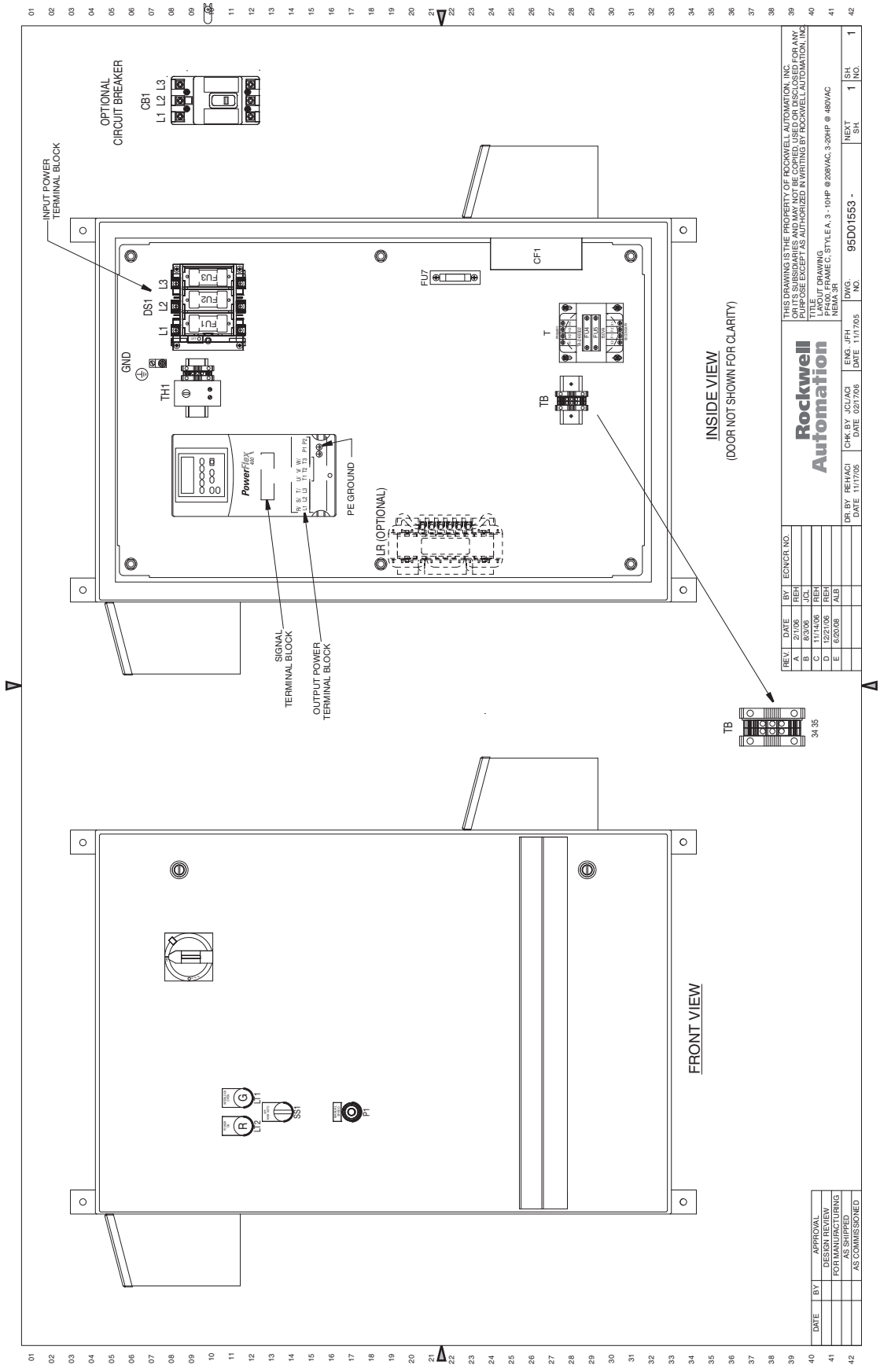


**Figure 1.40 15…30 Hp, 208V AC & 25…40 Hp, 460V AC Drives - NEMA/UL Type 3R**

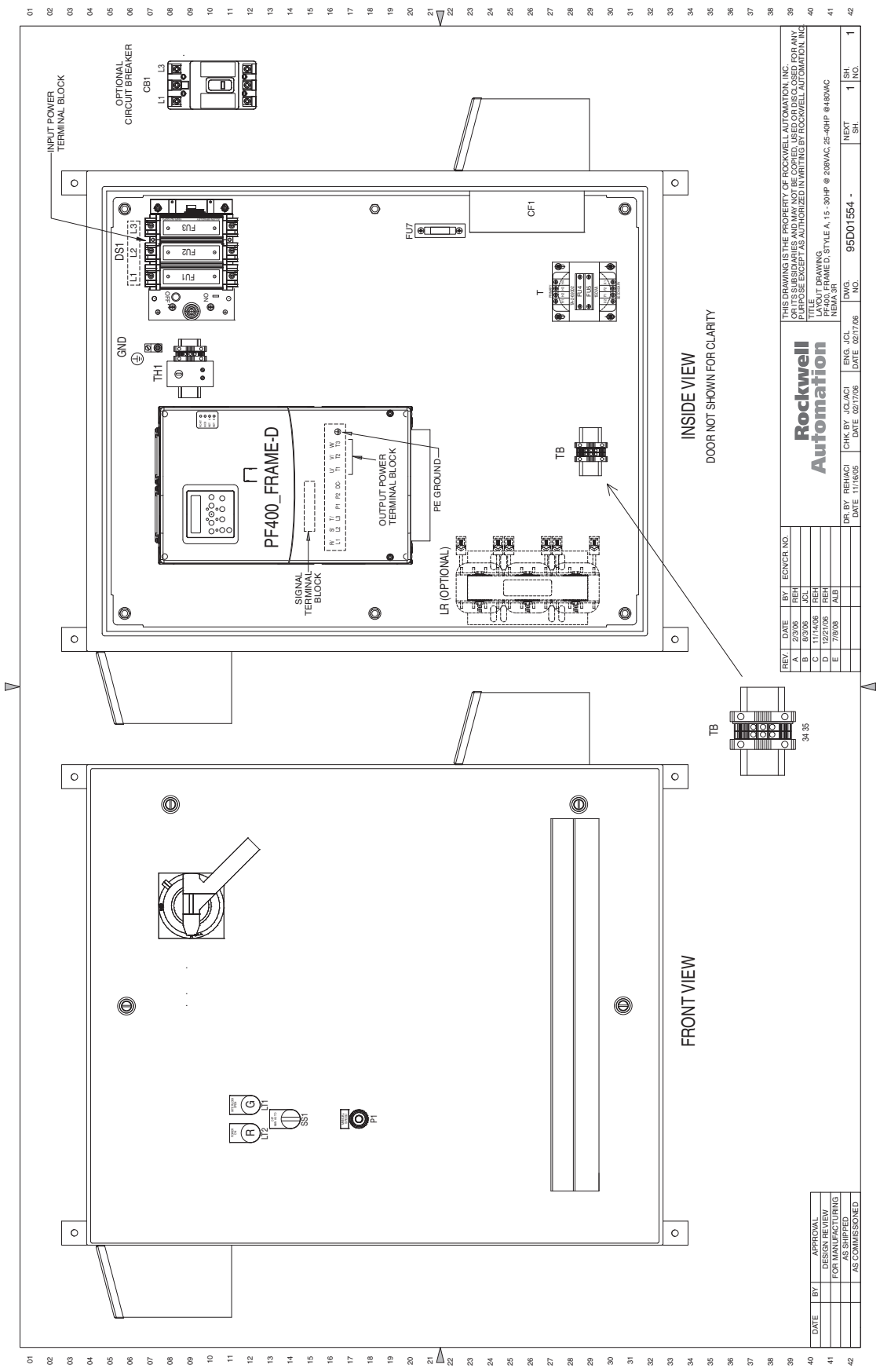


**Figure 1.41 50...60 Hp, 460V AC Drives - NEMA/UL Type 3R**

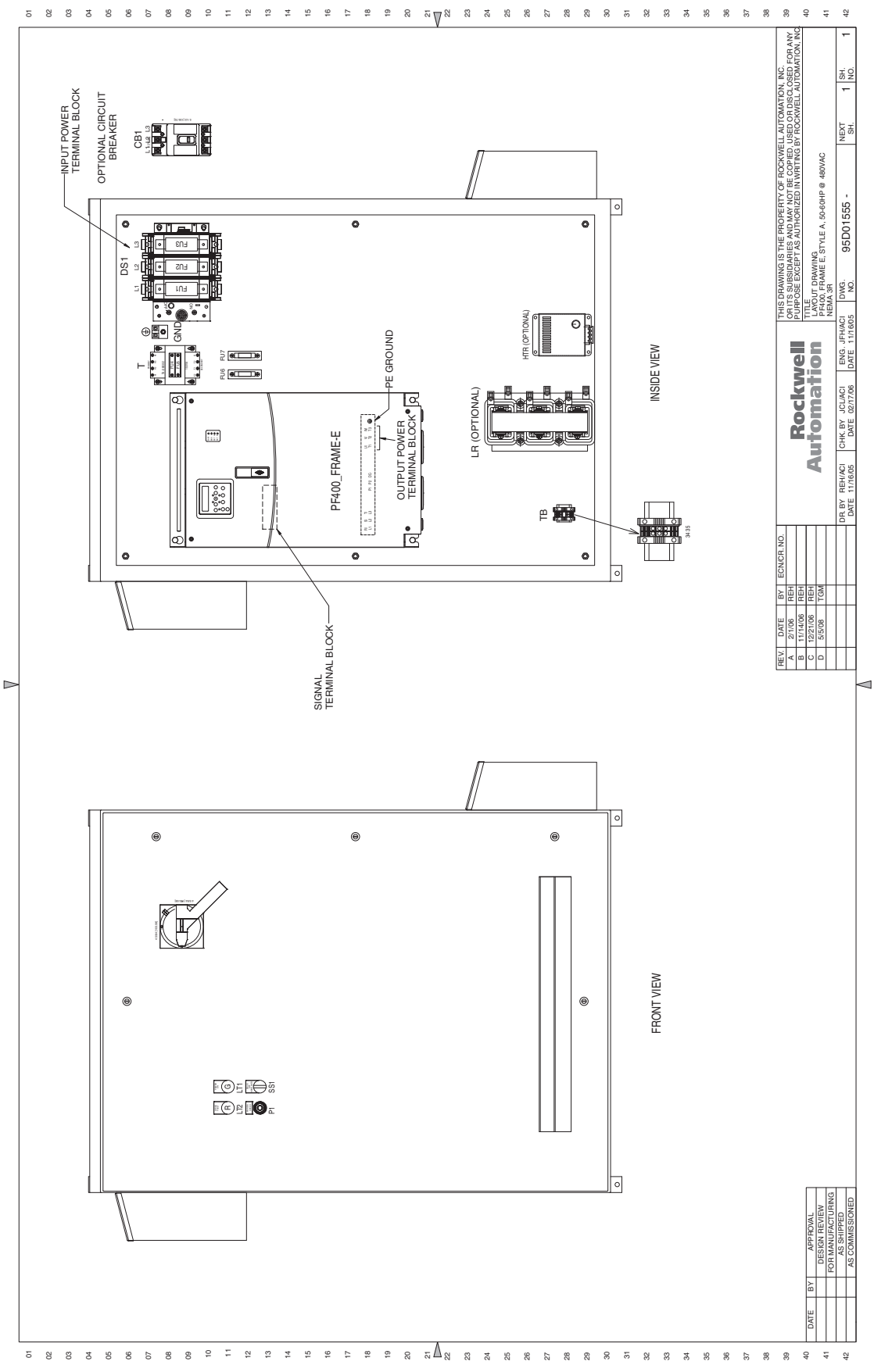


**Figure 1.42 40…50 Hp, 208V AC & 75…100 Hp, 460V AC Drives - NEMA/UL Type 3R**

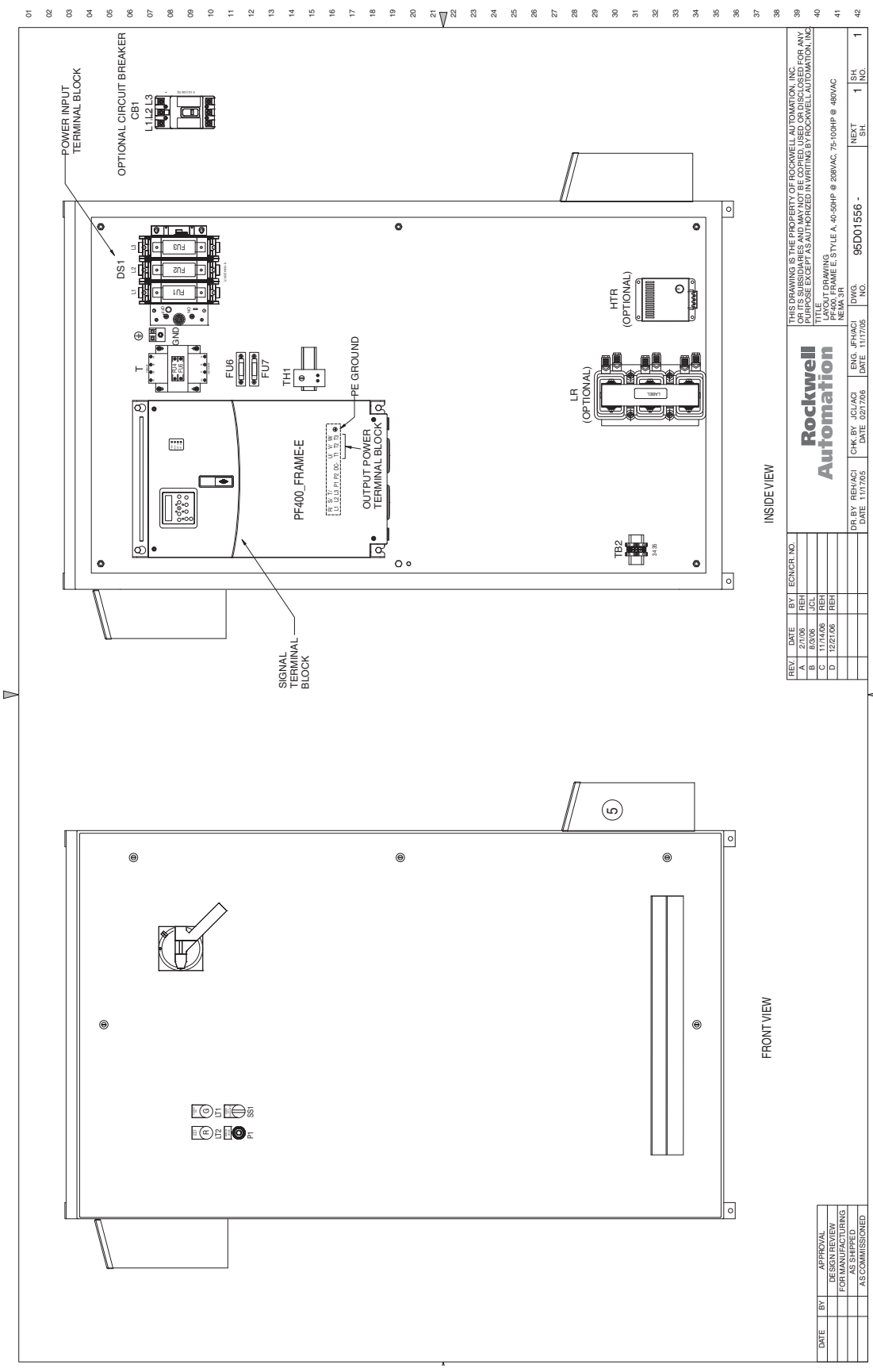
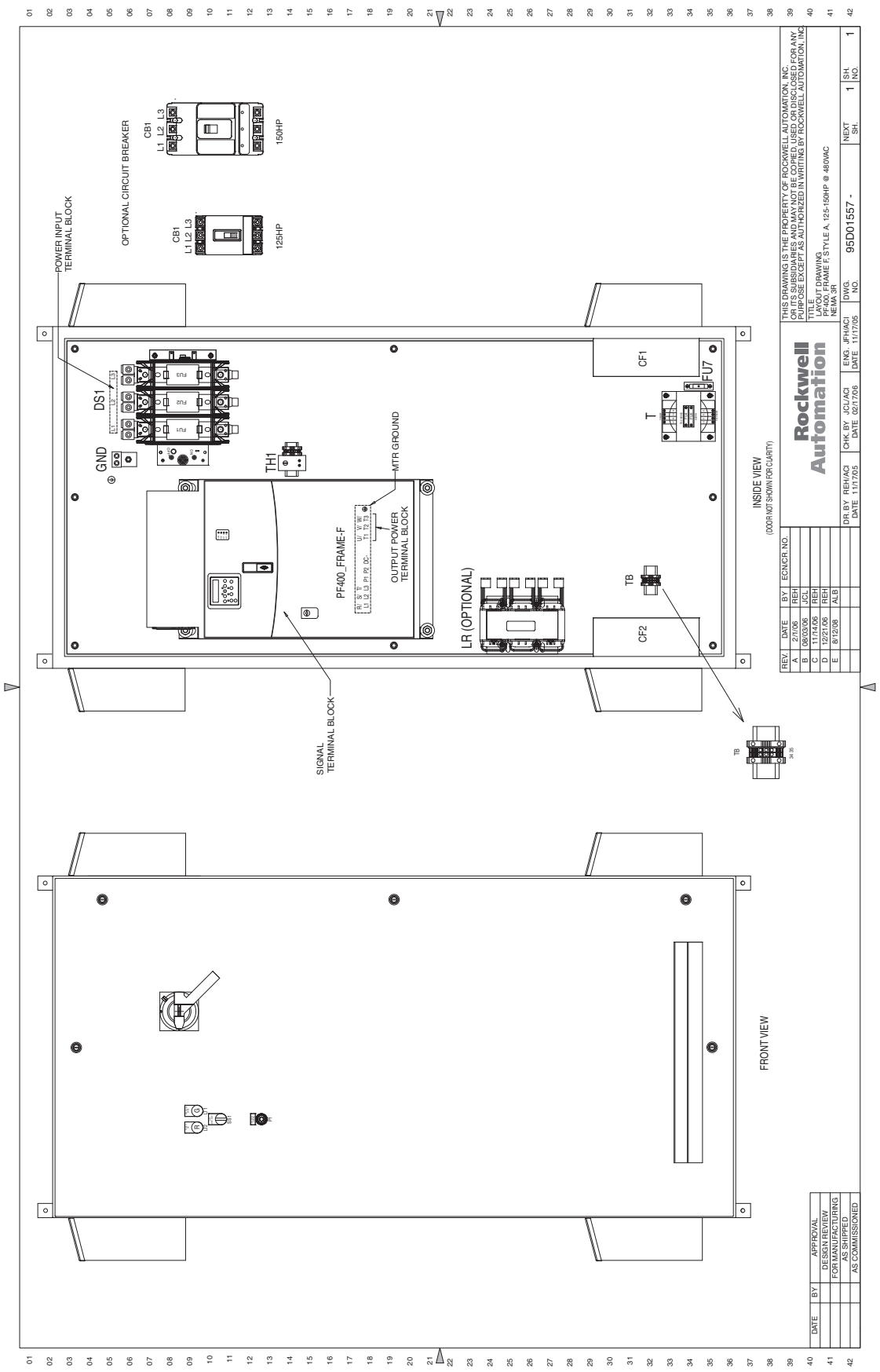


**Figure 1.43 125…150 Hp, 460V AC Drives - NEMA/UL Type 3R**



## Outline Drawings

**Figure 1.44 3.0…10 Hp, 208V AC & 3.0…20 Hp, 460V AC Drives - NEMA/UL Type 1**

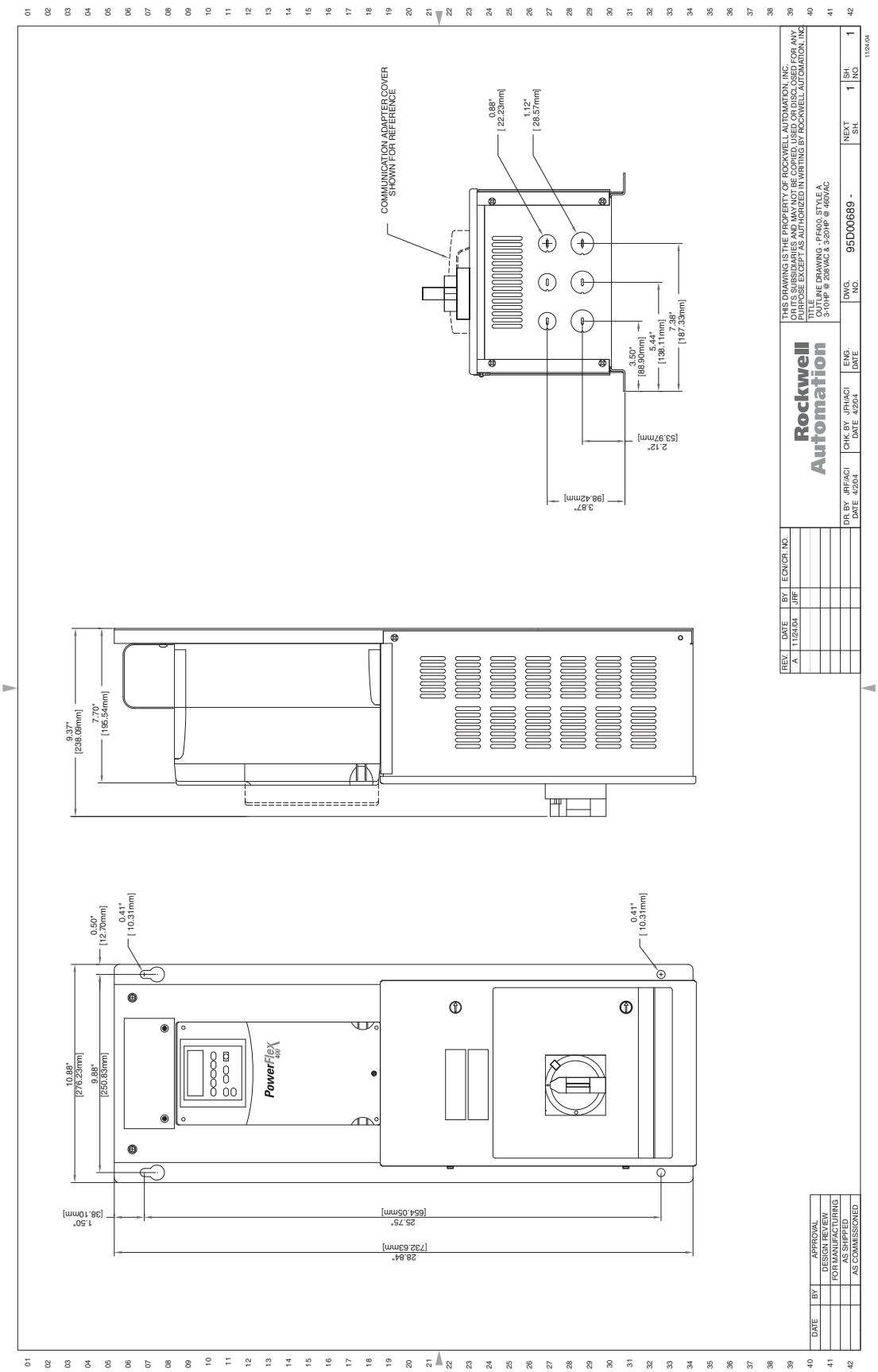


**Figure 1.45 15...20 Hp, 208V AC & 25...40 Hp, 460V AC Drives - NEMA/UL Type 1**

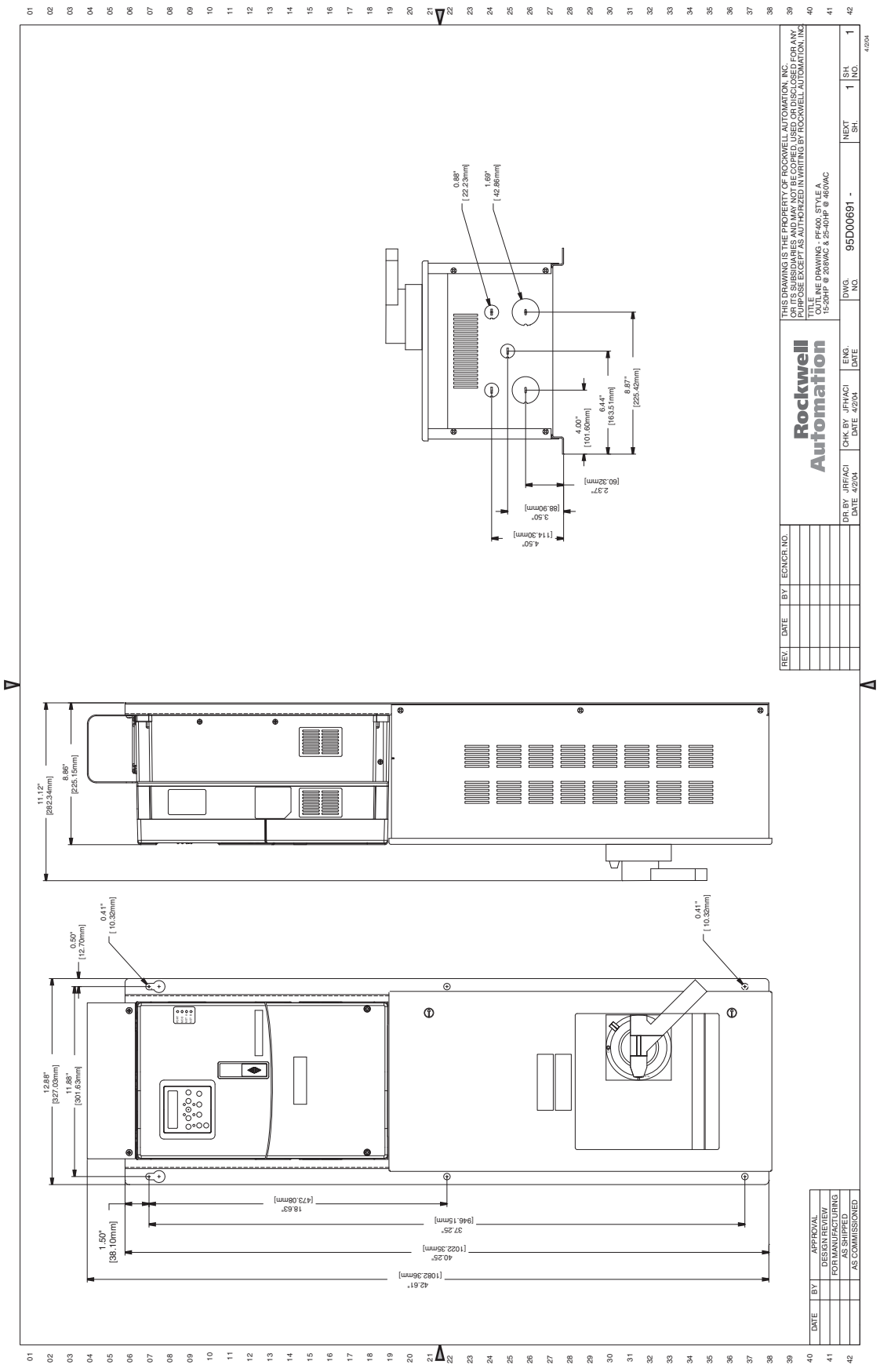


**Figure 1.46 25…30 Hp, 208V AC Drives - NEMA/UL Type 1**

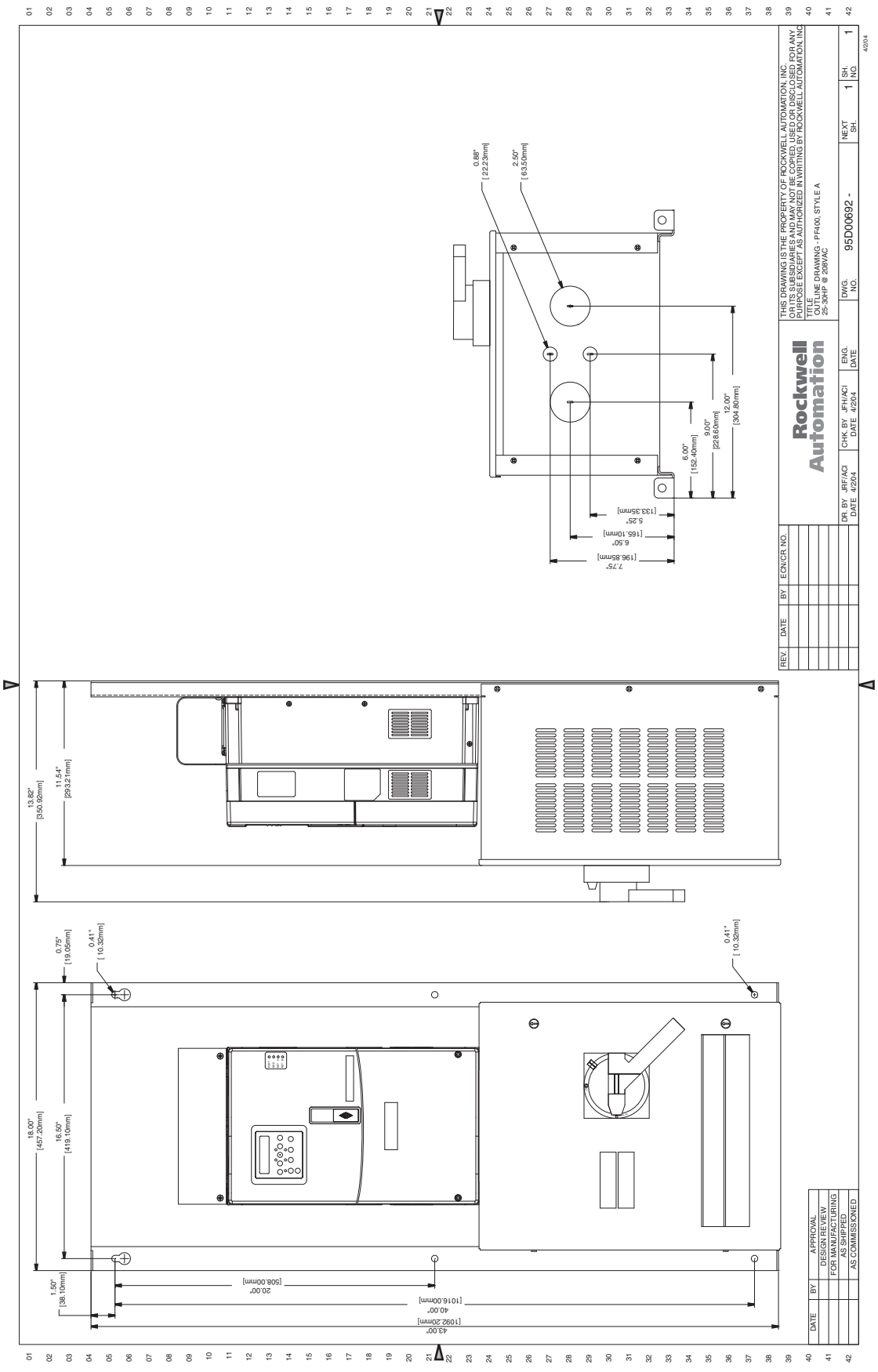


**Figure 1.47 40 Hp, 208V AC & 50…100 Hp, 460V AC Drives - NEMA/UL Type 1**

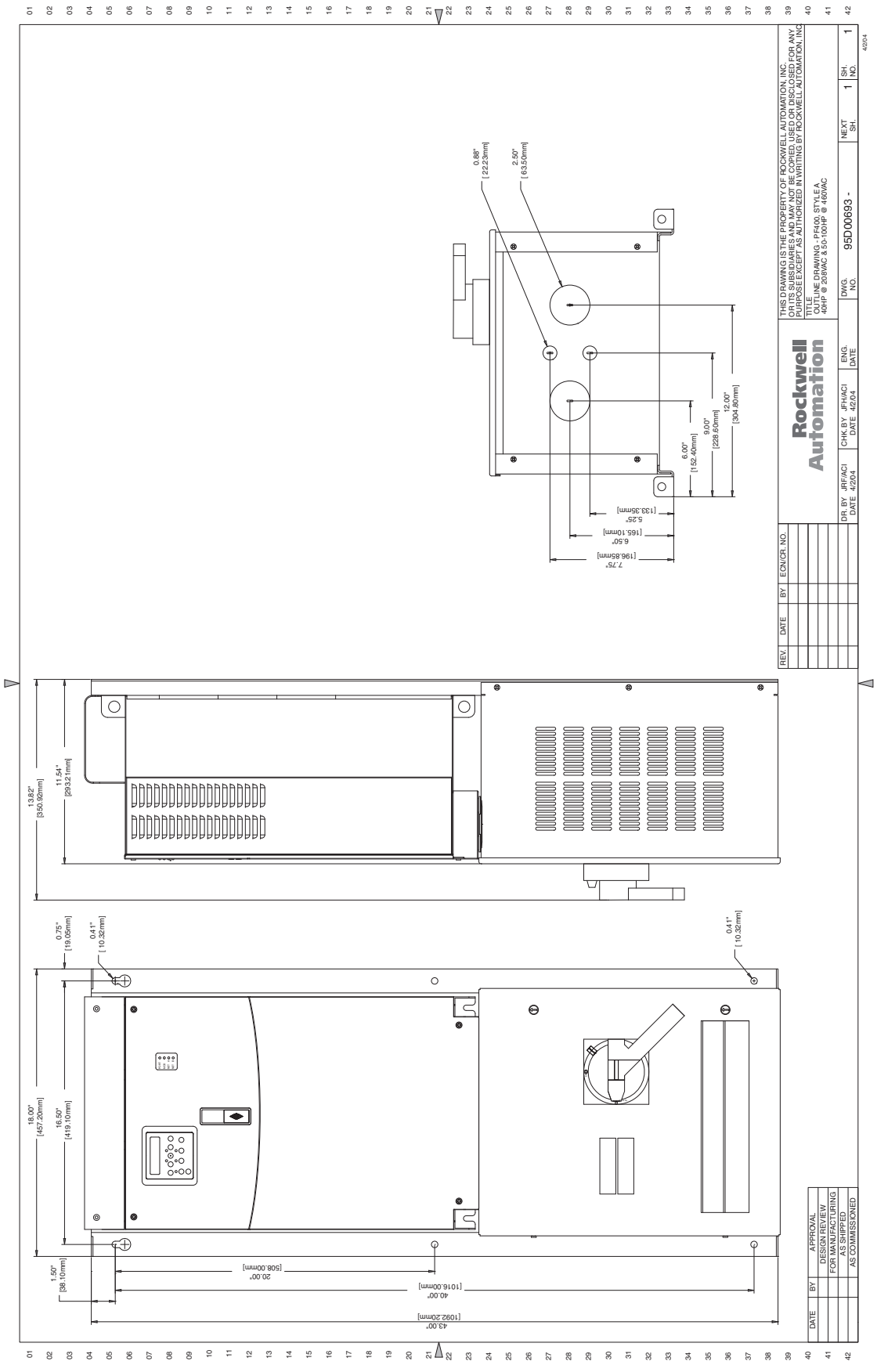


**Figure 1.48 50 Hp, 208V AC Drives - NEMA/UL Type 1**

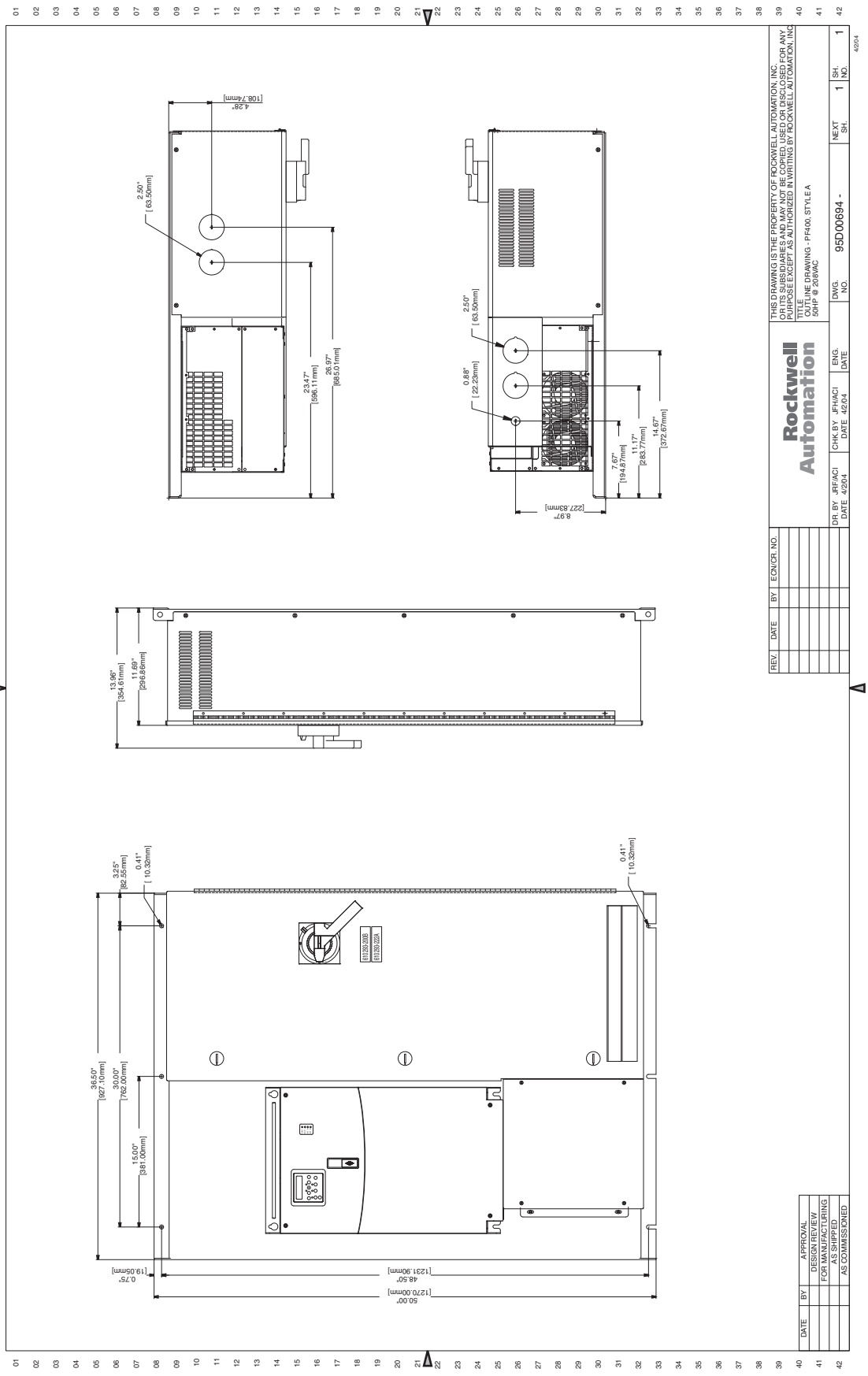


**Figure 1.49 125…150 Hp, 460V AC Drives - NEMA/UL Type 1**

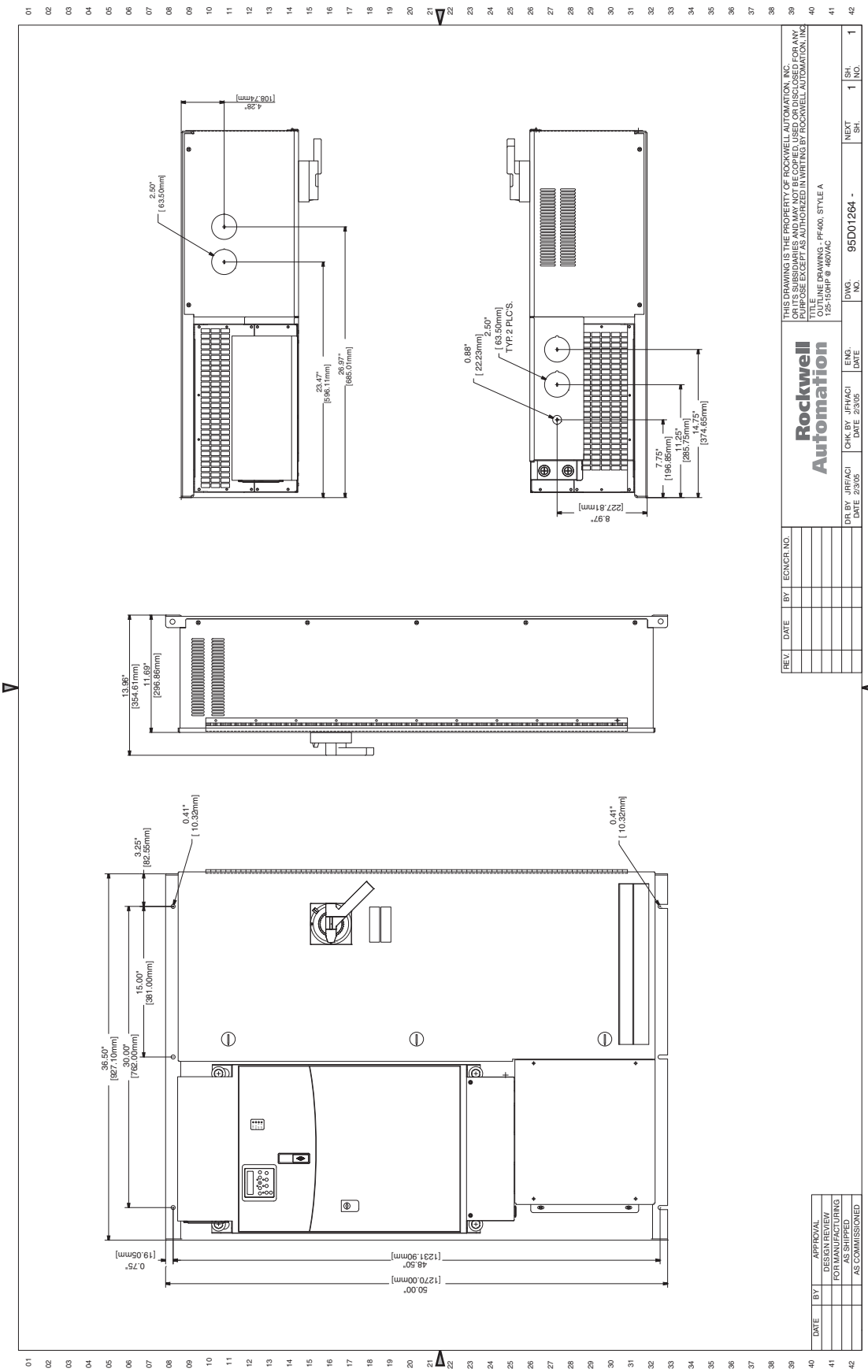


**Figure 1.50 200…250 Hp, 460V AC Drives - NEMA/UL Type 1**

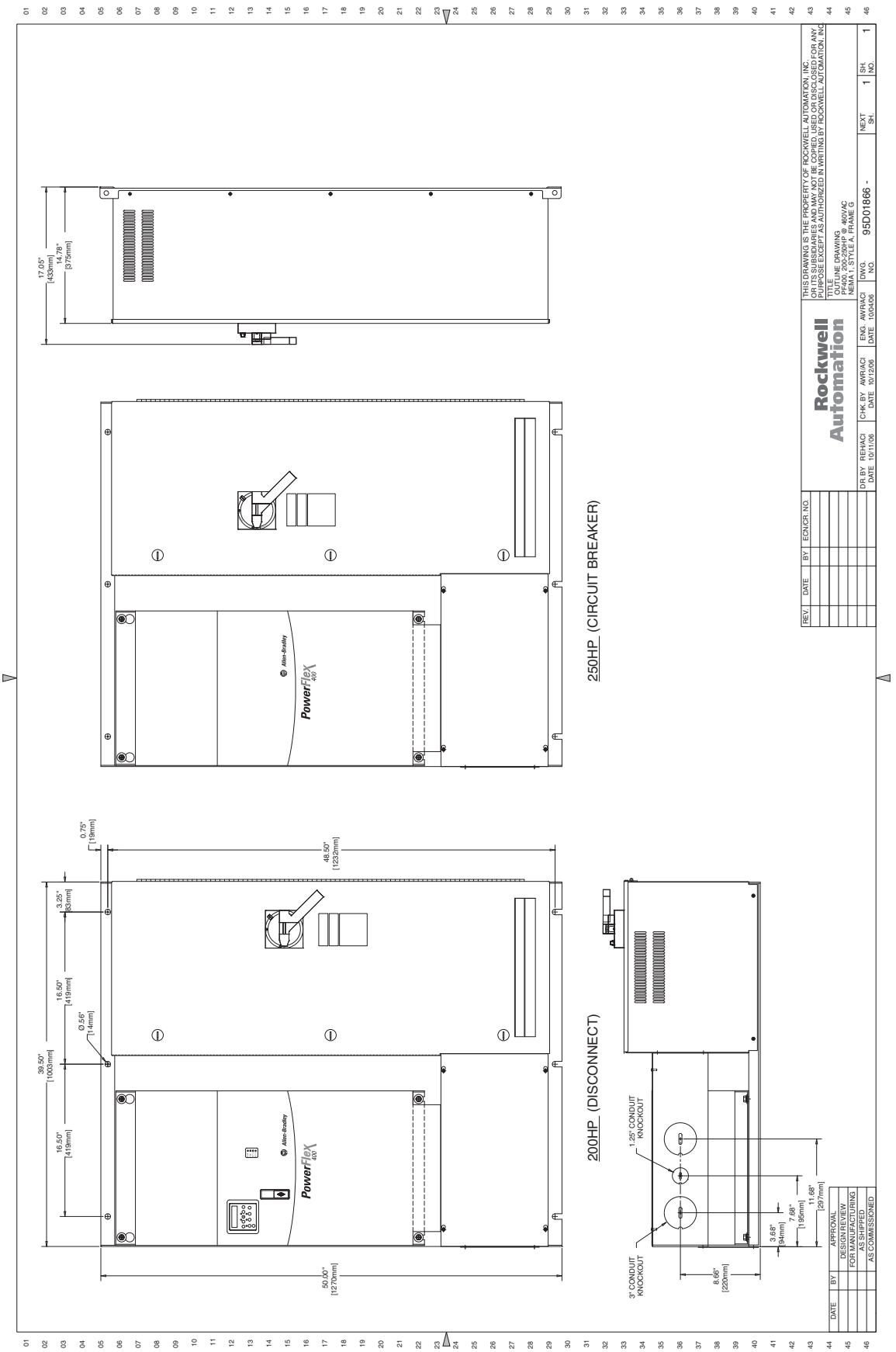


**Figure 1.51 300…350 Hp, 460V AC Drives - NEMA/UL Type 1**

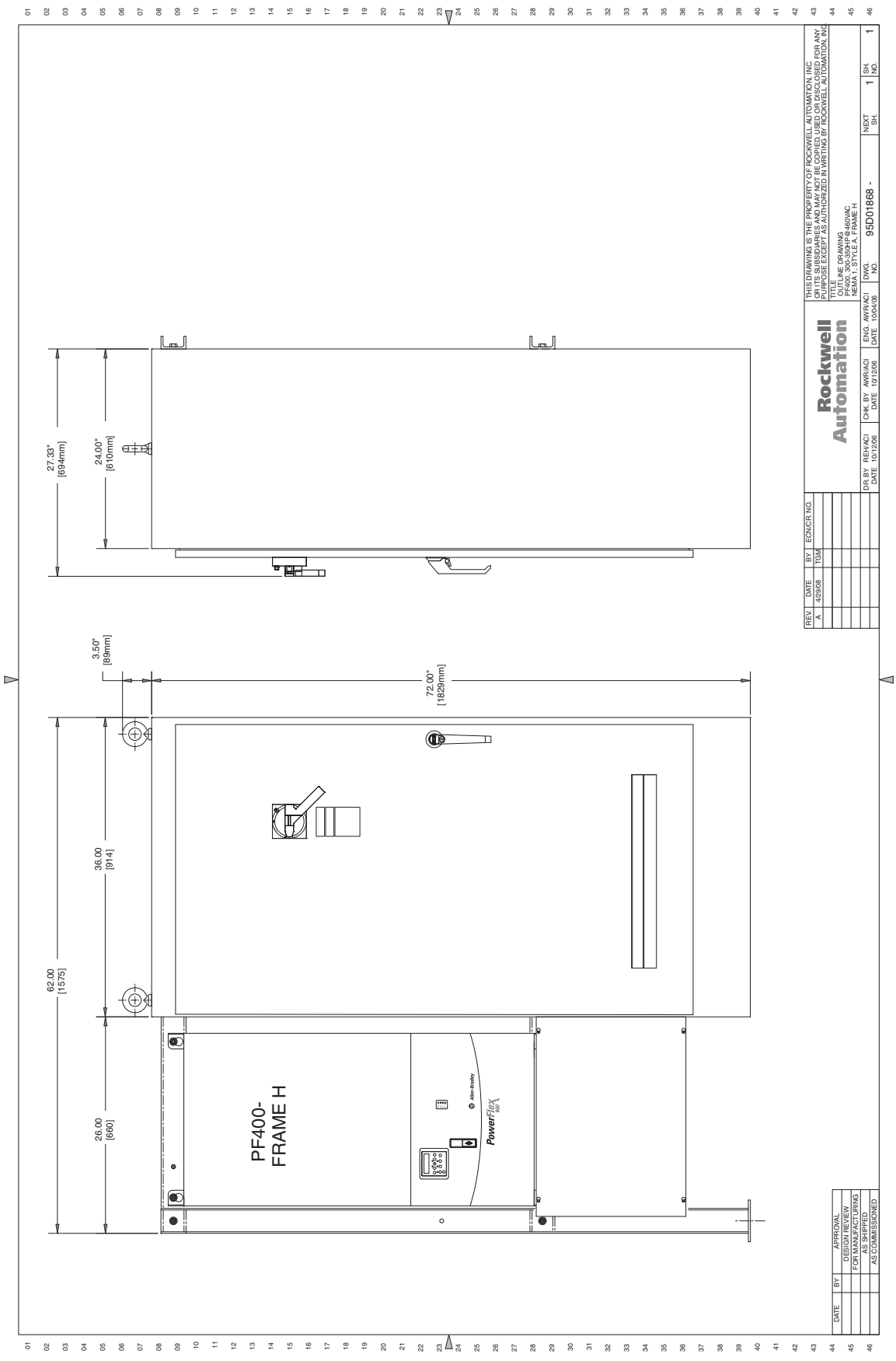


**Figure 1.52 3.0…5.0 Hp, 208V AC & 3.0…10 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1**

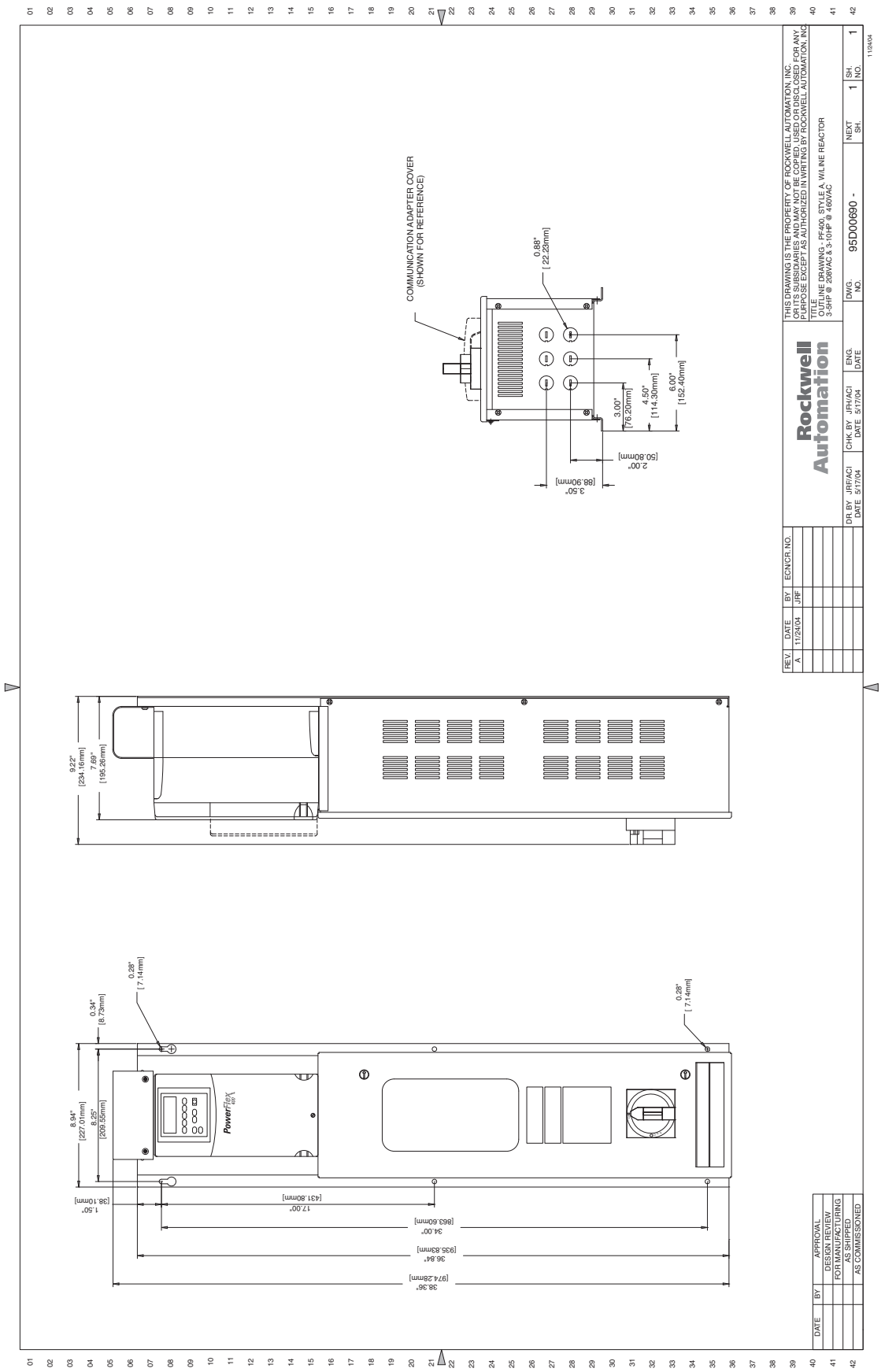


**Figure 1.53 7.5…10 Hp, 208V AC & 15…20 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1**

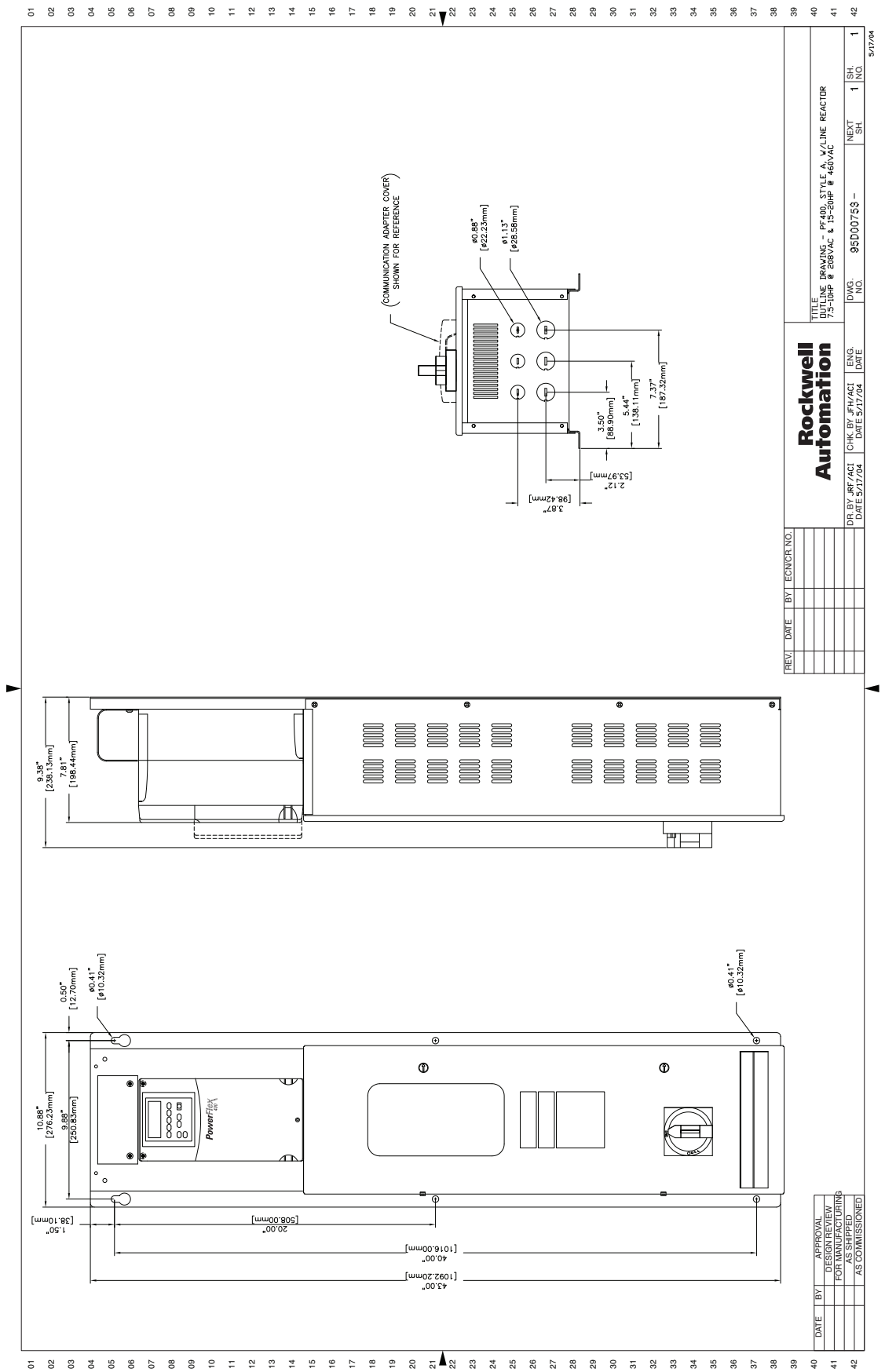


**Figure 1.54 15…20 Hp, 208V AC & 25…40 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1**

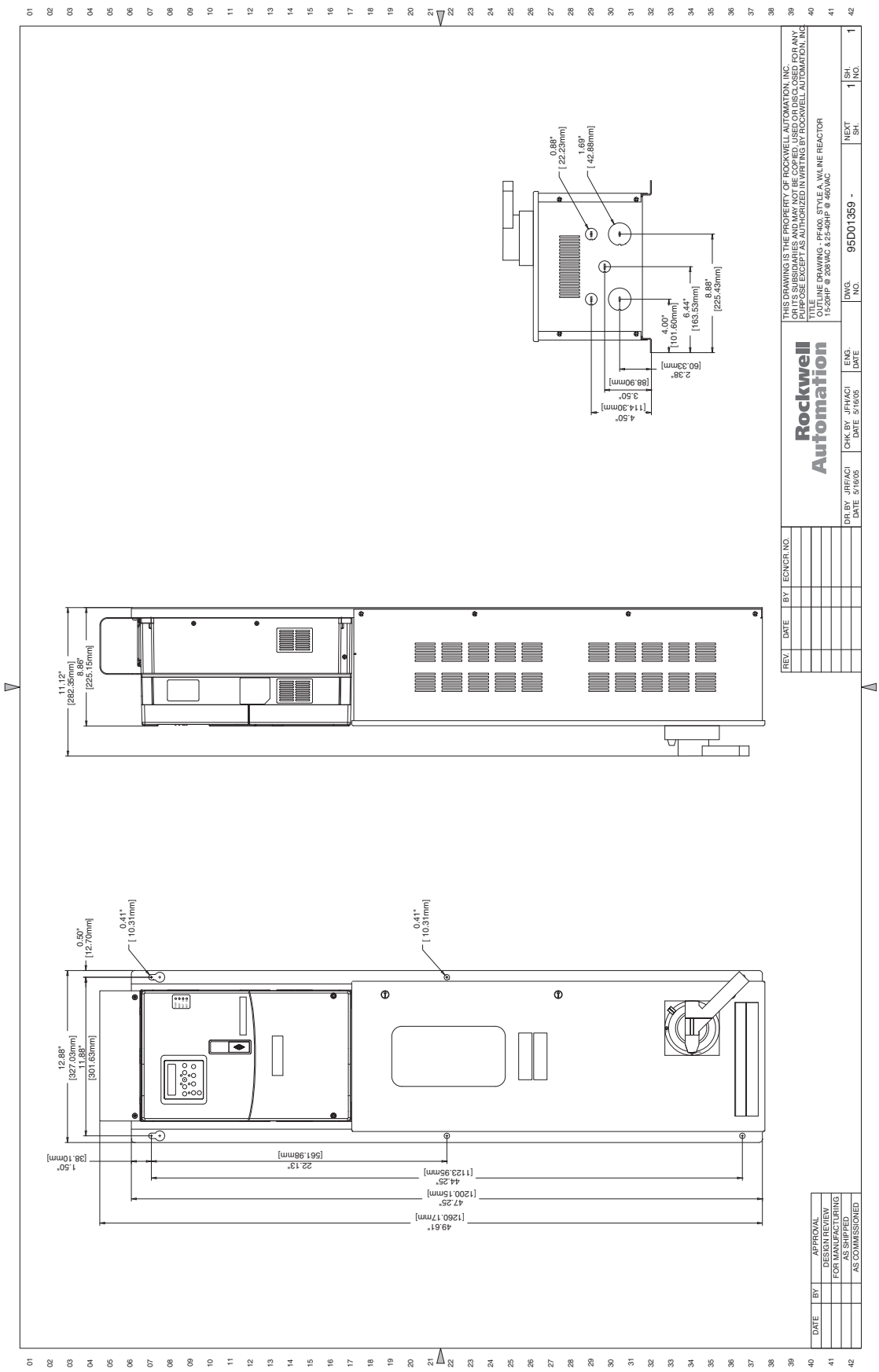


**Figure 1.55 25…30 Hp, 208V AC Drives with Line Reactor - NEMA/UL Type 1**

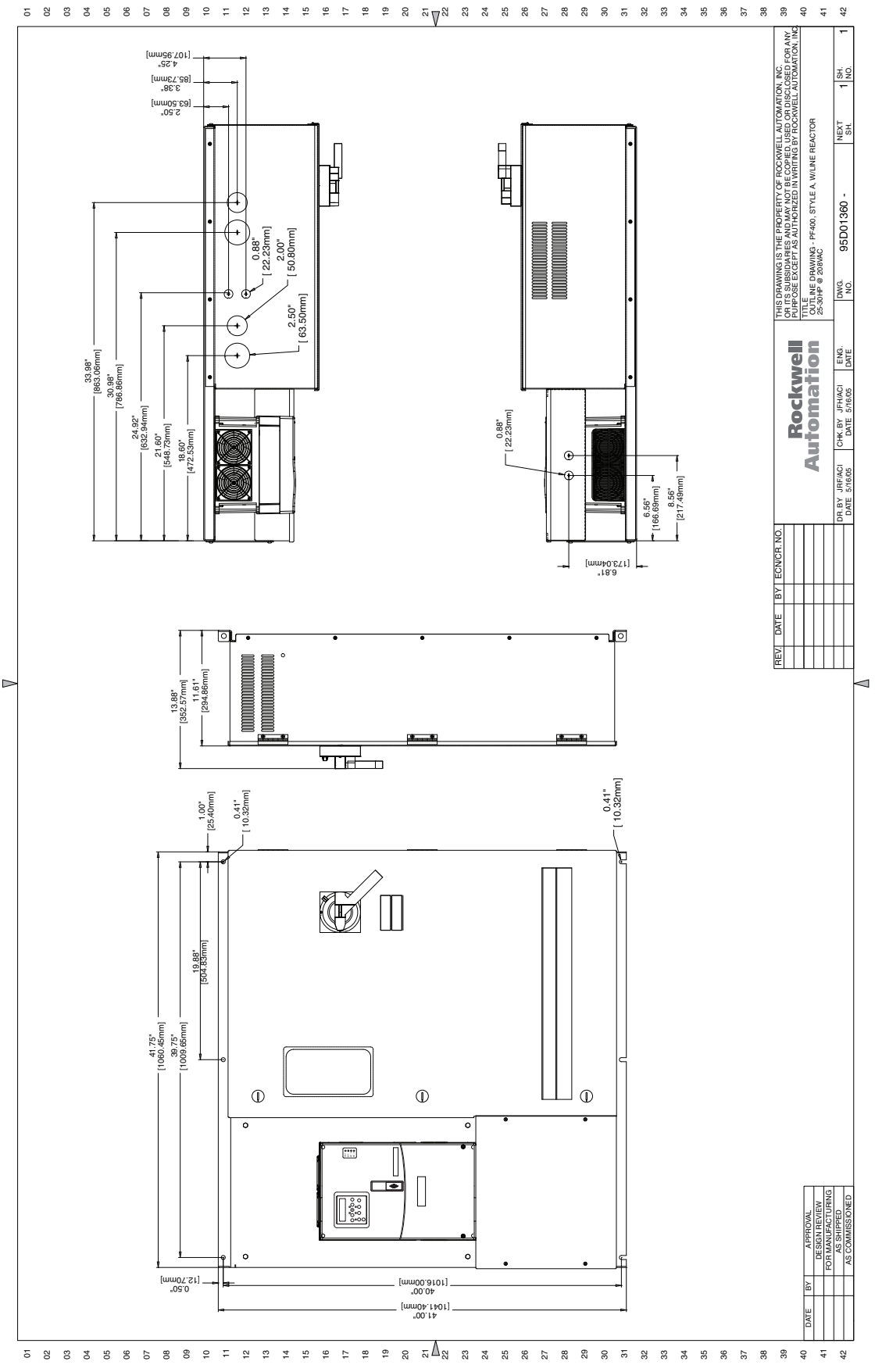


**Figure 1.56 40…50 Hp, 208V AC & 50…100 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1**

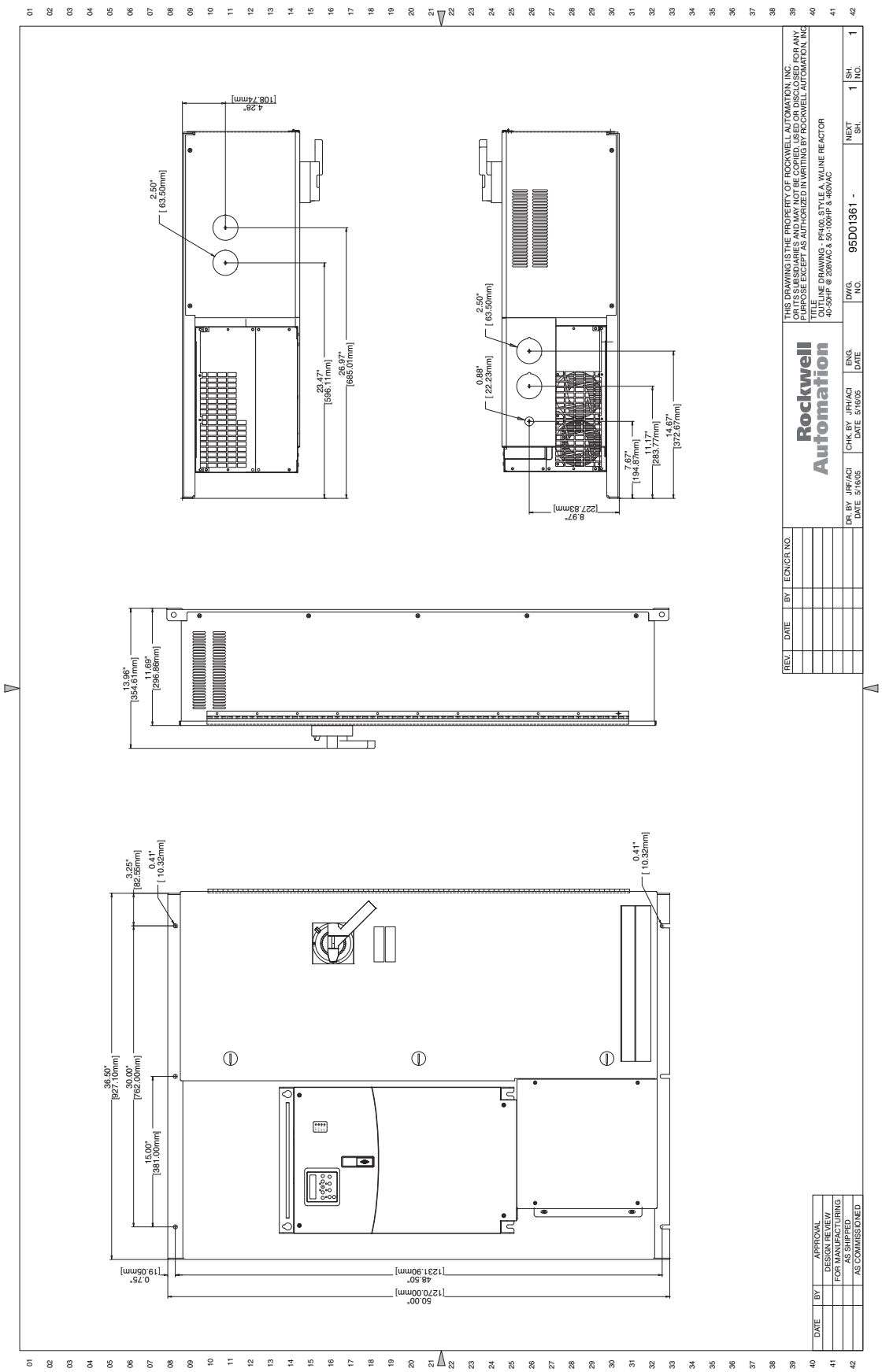


**Figure 1.57 125…150 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1**

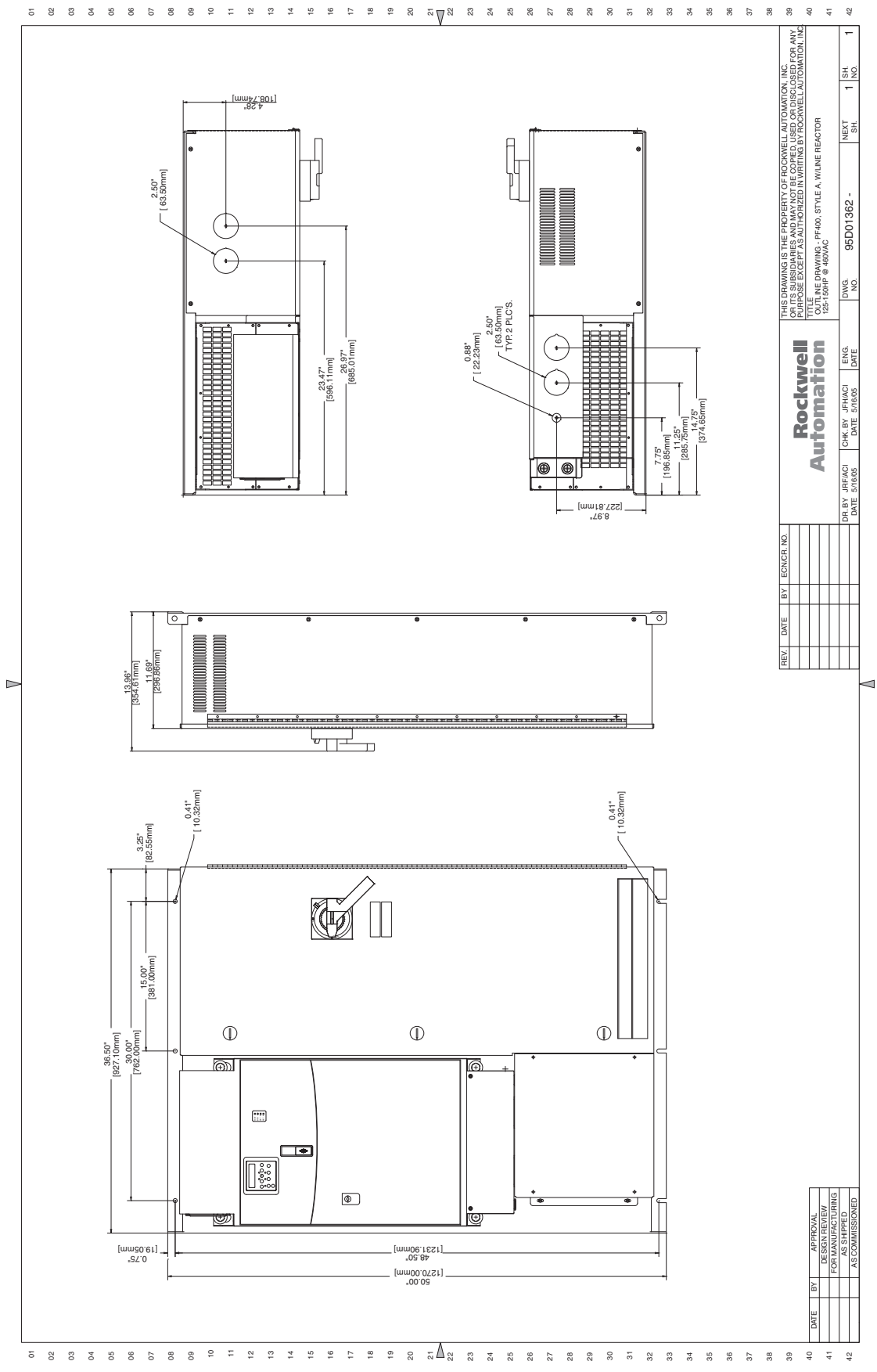
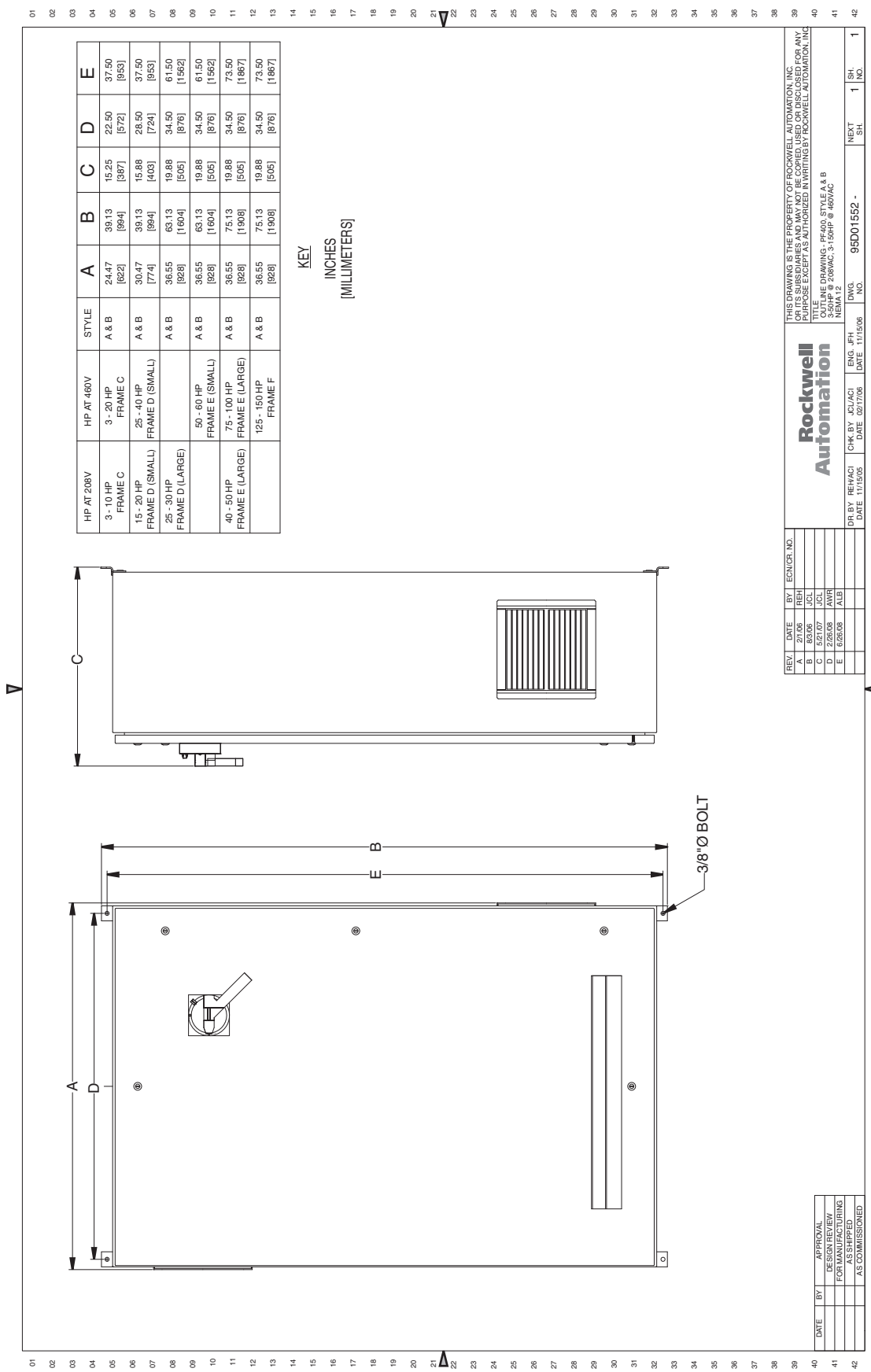


**Figure 1.58 3.0…50 Hp, 208V AC & 3.0…150 Hp, 460V AC Drives - NEMA/UL Type 12**




| HP AT 208V | HP AT 460V | STYLE | A | B | C | D | E |
|---|---|---|---|---|---|---|---|
| 3 - 10 HP FRAME C | 3 - 20 HP FRAME C | A & B | 24.47 [622] | 39.13 [994] | 15.25 [387] | 22.50 [572] | 37.50 [953] |
| 15 - 20 HP FRAME D (SMALL) | 25 - 40 HP FRAME D (SMALL) | A & B | 30.47 [774] | 39.13 [994] | 15.88 [403] | 28.50 [724] | 37.50 [953] |
| 25 - 30 HP FRAME D (LARGE) | | A & B | 36.55 [928] | 63.13 [1604] | 19.88 [505] | 34.50 [876] | 61.50 [1562] |
| | 50 - 60 HP FRAME E (SMALL) | A & B | 36.55 [928] | 63.13 [1604] | 19.88 [505] | 34.50 [876] | 61.50 [1562] |
| 40 - 50 HP FRAME E (LARGE) | 75 - 100 HP FRAME E (LARGE) | A & B | 36.55 [928] | 75.13 [1908] | 19.88 [505] | 34.50 [876] | 73.50 [1867] |
| | 125 - 150 HP FRAME F | A & B | 36.55 [928] | 75.13 [1908] | 19.88 [505] | 34.50 [876] | 73.50 [1867] |

**Figure 1.59 3.0…50 Hp, 208V AC & 3.0…150 Hp, 460V AC Drives - NEMA/UL Type 4**

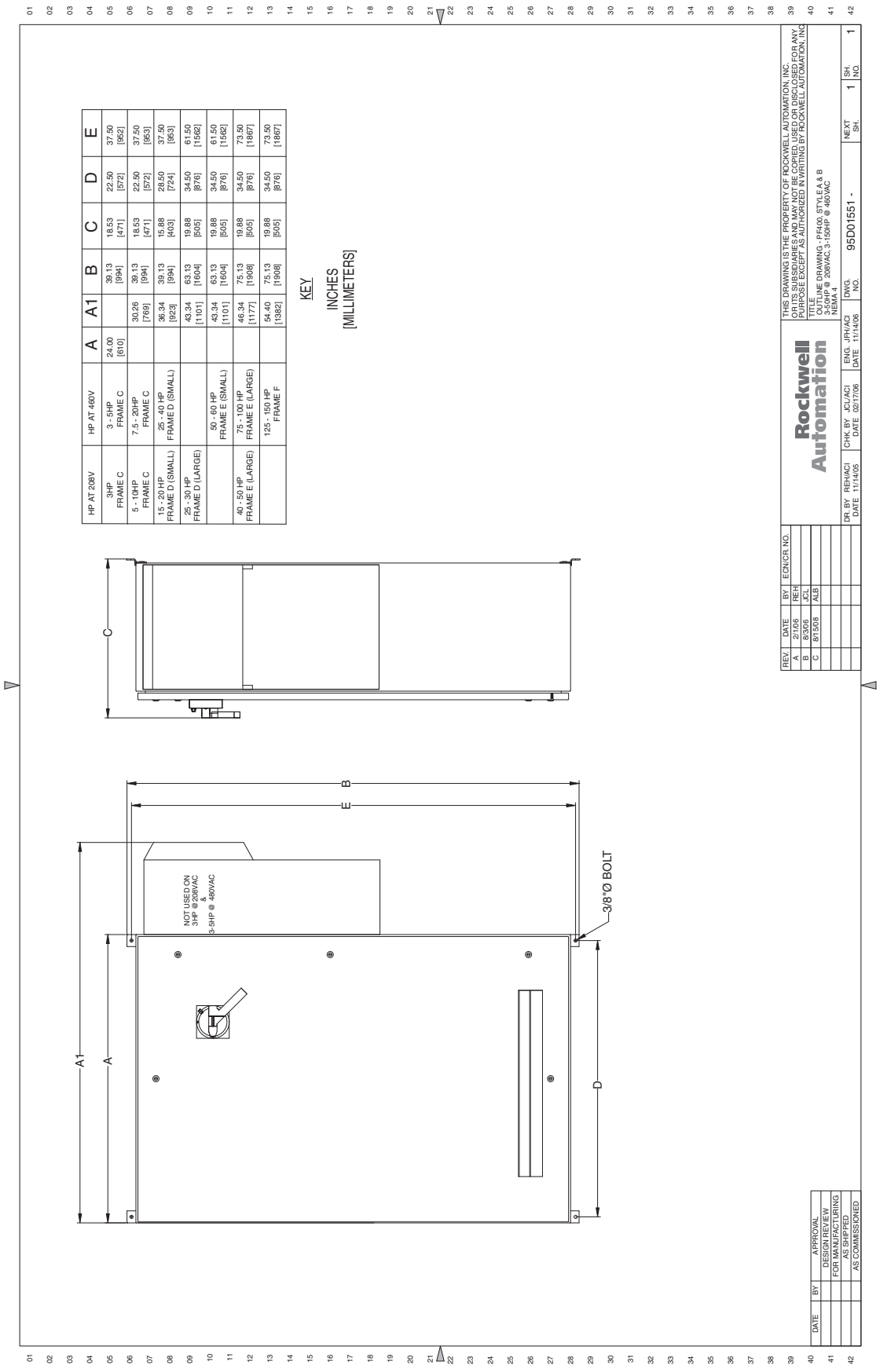
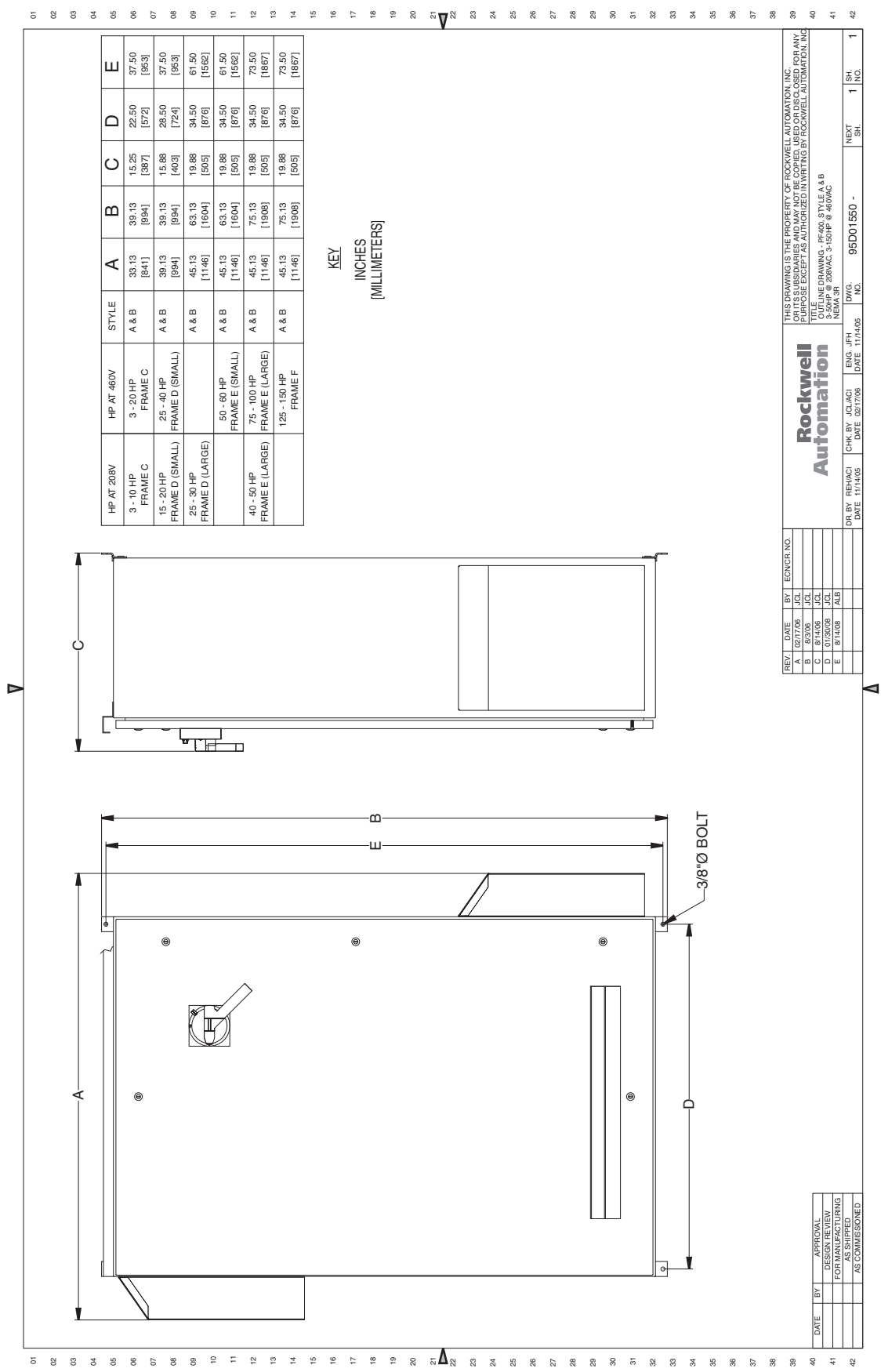


**Figure 1.60 3.0…50 Hp, 208V AC & 3.0…150 Hp, 460V AC Drives - NEMA/UL Type 3R**




| HP AT 208V | HP AT 460V | STYLE | A | B | C | D | E |
|---|---|---|---|---|---|---|---|
| 3 - 10 HP FRAME C | 3 - 20 HP FRAME C | A & B | 33.13 [841] | 39.13 [994] | 15.25 [387] | 22.50 [572] | 37.50 [953] |
| 15 - 20 HP FRAME D (SMALL) | 25 - 40 HP FRAME D (SMALL) | A & B | 39.13 [994] | 39.13 [994] | 15.88 [403] | 28.50 [724] | 37.50 [953] |
| 25 - 30 HP FRAME D (LARGE) | | A & B | 45.13 [1146] | 63.13 [1604] | 19.88 [505] | 34.50 [876] | 61.50 [1562] |
| | 50 - 60 HP FRAME E (SMALL) | A & B | 45.13 [1146] | 63.13 [1604] | 19.88 [505] | 34.50 [876] | 61.50 [1562] |
| 40 - 50 HP FRAME E (LARGE) | 75 - 100 HP FRAME E (LARGE) | A & B | 45.13 [1146] | 75.13 [1908] | 19.88 [505] | 34.50 [876] | 73.50 [1867] |
| | 125 - 150 HP FRAME F | A & B | 45.13 [1146] | 75.13 [1908] | 19.88 [505] | 34.50 [876] | 73.50 [1867] |

## Notes:

efesotomasyon.com

# 3 Contactor Full Feature Bypass with Disconnect Package (Style B/N)

## Style Explanation

- Style B = Fused Disconnect
- Style N = Circuit Breaker

## Chapter Objectives

This chapter describes the features and operation for the 3 Contactor Full Feature Bypass with Disconnect Package (Style B/N).


| For information on ... | See page ... |
|---|---|
| Hardware Overview | 2-1 |
| Electrical Installation | 2-6 |
| Operating Modes | 2-10 |
| Parameter Defaults | 2-11 |
| Drawing Index | 2-12 |
| Schematic Drawings | 2-15 |
| Interconnect Drawings | 2-31 |
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## Hardware Overview

The 3 Contactor Full Feature Bypass with Disconnect Package (Style B/N) allows the motor to be manually transferred from drive output to the AC line, or from the AC line to the drive, while the motor is at zero (0) speed. The contactor bypass is electrically interlocked. A means for disconnecting input power via a door interlocked fuse disconnect switch is standard. In addition, this package is supplied with a bypass control interface which provides status indication and allows for remote activation of the bypass circuit.

### Main Disconnect Switch (DS1)

An Allen-Bradley Bulletin 194R fused disconnect switch with lockable rotary mounted operator handle is provided. The disconnect switch is designed to meet disconnect switch requirements for branch circuit protection. The door-mounted handle accepts up to three (3) padlocks.

### Main Circuit Breakers (CB1)

An Allen-Bradley Bulletin 140U circuit breaker with lockable rotary mounted operator handle is provided. The circuit breaker is designed to meet circuit breaker requirements for branch circuit protection. The door-mounted handle accepts up to three (3) padlocks.

## Main Fuses (FU1-FU3)

**ATTENTION:** Most codes require that upstream branch circuit protection be provided to protect input power wiring. Install the fuses recommended in Table 2.A. Do not exceed the fuse ratings. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

Input line branch circuit protection fuses must be used to protect the input power lines. If input fuses are not provided with your drive, recommended fuse values are shown in Table 2.A. The input fuse ratings listed in Table 2.A are applicable for one drive per branch circuit. No other load may be applied to that fused circuit.

The recommended fuse type for all PowerFlex Drives for Fan and Pump Applications is UL Class J, 600V.

**Table 2.A Fuse Recommendations**

| Drive Rating | | | Fuse Rating |
|---|---|---|---|
| **Input Voltage** | **kW** | **Hp** | **Amps** |
| 208V AC – 3-Phase | 2.2 | 3.0 | 20 |
| | 3.7 | 5.0 | 20 |
| | 5.5 | 7.5 | 35 |
| | 7.5 | 10 | 40 |
| | 11 | 15 | 80 |
| | 15 | 20 | 100 |
| | 18.5 | 25 | 125 |
| | 22 | 30 | 150 |
| | 30 | 40 | 200 |
| | 37 | 50 | 250 |
| 460V AC – 3-Phase | 2.2 | 3.0 | 10 |
| | 4.0 | 5.0 | 15 |
| | 5.5 | 7.5 | 20 |
| | 7.5 | 10 | 20 |
| | 11 | 15 | 35 |
| | 15 | 20 | 35 |
| | 18.5 | 25 | 60 |
| | 22 | 30 | 70 |
| | 30 | 40 | 80 |
| | 37 | 50 | 100 |
| | 45 | 60 | 150 |
| | 55 | 75 | 175 |
| | 75 | 100 | 200 |
| | 90 | 125 | 250 |
| | 110 | 150 | 350 |
| | 132 | 200 | 400 |
| | 160 | 250 | 500 |
| | 200 | 300 | 600 |
| | 250 | 350 | 700 |

## Contactors (DIC, DOC, BC)

Allen-Bradley Bulletin 100 Contactors are provided for all ratings. The contactors function as follows:

1. Drive-input contactor (DIC) opens and closes input to the drive.
2. Drive-output contactor (DOC) opens and closes the connection between the drive and the motor.
3. Bypass contactor (BC) opens and closes the connection to line-start the motor.

## Motor Overload Relay (OL)

The motor overload relay is set at the factory to 100% of the drive output current. In many cases, this setting matches the motor full load amps (FLA). However, before starting the drive, you should check the setting on the motor overload relay to assure that it is set properly for your motor.

- For motors with a service factor less than 1.15, set the motor overload relays to 0.9x motor FLA.
- For motors with a service factor equal to, or greater than 1.15, set the motor overload relay to the motor FLA.

**Figure 2.1 Setting Motor Overload**

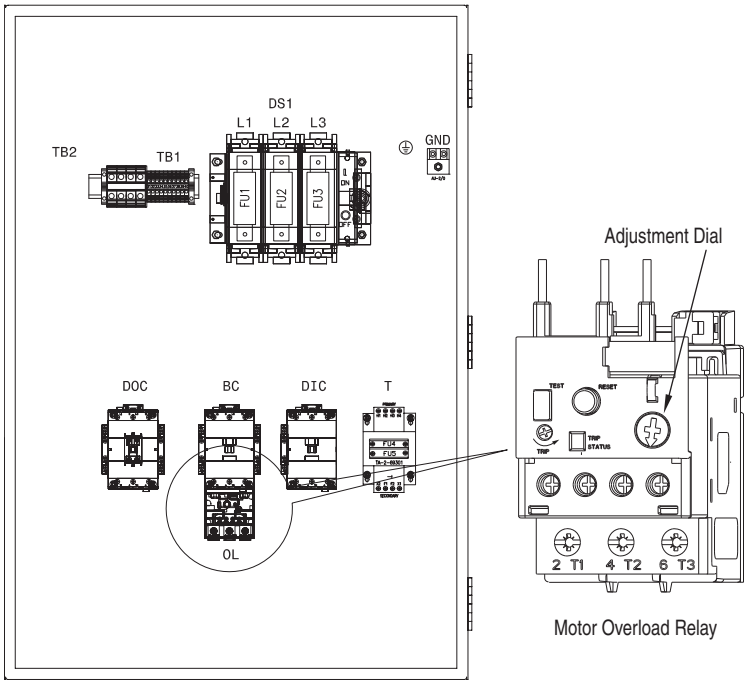


**Table 2.B Overload Ratings**

| Drive Rating | | | Overload Rating | |
|---|---|---|---|---|
| **Input Voltage** | **kW** | **Hp** | **Trip Class** | **Adjustment Rating (Amps)** |
| 208V AC – 3-Phase | 2.2 | 3.0 | 20 | 3.2 - 16 |
| | 3.7 | 5.0 | 20 | 5.4 - 27 |
| | 5.5 | 7.5 | 20 | 9 - 45 |
| | 7.5 | 10 | 20 | 9 - 45 |
| | 11 | 15 | 20 | 18 - 90 |
| | 15 | 20 | 20 | 18 - 90 |
| | 18.5 | 25 | 20 | 18 - 90 |
| | 22 | 30 | 20 | 40 - 200 |
| | 30 | 40 | 20 | 40 - 200 |
| | 37 | 50 | 20 | 40 - 200 |
| 460V AC – 3-Phase | 2.2 | 3.0 | 20 | 3.2 - 16 |
| | 4.0 | 5.0 | 20 | 3.2 - 16 |
| | 5.5 | 7.5 | 20 | 3.2 - 16 |
| | 7.5 | 10 | 20 | 5.4 - 27 |
| | 11 | 15 | 20 | 9 - 45 |
| | 15 | 20 | 20 | 9 - 45 |
| | 18.5 | 25 | 20 | 9 - 45 |
| | 22 | 30 | 20 | 9 - 45 |
| | 30 | 40 | 20 | 18 - 90 |
| | 37 | 50 | 20 | 18 - 90 |
| | 45 | 60 | 20 | 18 - 90 |
| | 55 | 75 | 20 | 40 - 200 |
| | 75 | 100 | 20 | 40 - 200 |
| | 90 | 125 | 20 | 40 - 200 |
| | 110 | 150 | 20 | 40 - 200 |
| | 132 | 200 | 20 | 100 - 500 |
| | 160 | 250 | 20 | 100 - 500 |
| | 200 | 300 | 20 | 100 - 500 |
| | 250 | 350 | 20 | 100 - 500 |

## Control Transformer (T1)

115V AC control power is obtained via a supplied control power transformer. The control transformer is fused on the primary.

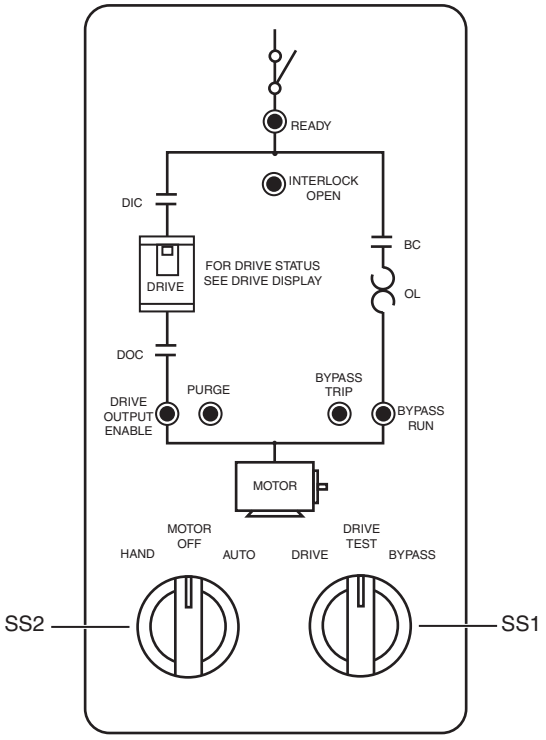
## Bypass Control Interface (CP1)

The operator interface on the bypass option box shows the following LEDs:

- Ready (green) - On when power is applied to the drive-bypass unit.
- Interlock Open (amber) - On when the customer interlock or Aux Fault is de-energized.
- Bypass Run (green) - On when the bypass contactor (BC) is energized.
- Bypass Trip (red) - On when a bypass fault condition exists (for example, bypass motor overload has tripped).
- Purge (amber) - On when the purge condition is active.
- Drive Output Enable (Green) - On when the drive output contactor (DOC) is energized.

In addition, the Bypass Control Interface contains two selector switches. Selector Switch 1 (SS1) determines the state of the DIC, DOC and BC contactors. Selector Switch 2 (SS2) determines the source of control logic.

**Figure 2.2 Bypass Control Interface**



## Electrical Installation

### Input Power Wiring

Use 75 °C rated copper conductors only for customer power wiring.

Refer to the PowerFlex 400 User Manual for additional detailed information about input power wiring recommendations and selection.

**ATTENTION:** Protect the contents of the options cabinet from metal chips and other debris while drilling the conduit openings. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

**ATTENTION:** Do not route signal and control wiring with power wiring in the same conduit. This can cause interference with drive operation. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

To connect AC input power to the drive package:

❑ **1.** Select the proper wire size according to NEC and all applicable local codes and standards. Note that you must punch openings in the Option Cabinet of the desired conduit size, following NEC and all applicable local codes and standards. Power terminal block specifications are listed in Table 2.C.

❑ **2.** Connect the three-phase AC input power leads (three-wire VAC) to the appropriate terminals. Connect the AC input power leads to terminals L1, L2, L3 on the fused disconnect switch.

❑ **3.** Tighten the AC input terminal power terminals to the proper torque according to drive type as shown in Table 2.C.

**Table 2.C AC Input Power Terminal Block Specification**

| Volts AC | kW | Hp | Maximum Wire Size(1) | Minimum Wire Size | Recommended Torque |
|---|---|---|---|---|---|
| 208V | 2.2...3.7 | 3.0...5.0 | 8.4 $mm^2$ (8 AWG) | 2.5 $mm^2$ (14 AWG) | 4.0 N•m (35 lb•in) |
| | 5.5...7.5 | 7.5...10 | 16.0 $mm^2$ (4 AWG) | 2.5 $mm^2$ (14 AWG) | 4.0 N•m (35 lb•in) |
| | 11...15 | 15...20 | 33.6 $mm^2$ (2 AWG) | 2.5 $mm^2$ (14 AWG) | 17.5 N•m (155 lb•in) |
| | 18.5...30 | 25...40 | 250 MCM | 10.0 $mm^2$ (6 AWG) | 31.1 N•m (275 lb•in) |
| | 37 | 50 | 350 MCM | 35.0 $mm^2$ (1/0 AWG) | 31.1 N•m (275 lb•in) |
| 460V | 2.2...7.5 | 3.0...10 | 8.4 $mm^2$ (8 AWG) | 2.5 $mm^2$ (14 AWG) | 4.0 N•m (35 lb•in) |
| | 11...18.5 | 15...25 | 16.0 $mm^2$ (4 AWG) | 2.5 $mm^2$ (14 AWG) | 4.0 N•m (35 lb•in) |
| | 22...37 | 30...50 | 33.6 $mm^2$ (2 AWG) | 2.5 $mm^2$ (14 AWG) | 17.5 N•m (155 lb•in) |
| | 45...75 | 60...100 | 250 MCM | 10.0 $mm^2$ (6 AWG) | 31.1 N•m (275 lb•in) |
| | 90...110 | 125...150 | (2) 350 MCM | (2) 10.0 $mm^2$ (6 AWG) | 31.1 N•m (275 lb•in) |
| | 132 | 200 | (2) 350 MCM | (2) 35.0 $mm^2$ (1/0 AWG) | 31.1 N•m (275 lb•in) |
| | 160...200 | 250...300 | (2) 350 MCM | (2) 70.0 $mm^2$ (3/0 AWG) | 31.1 N•m (275 lb•in) |
| | 250 | 350 | (2) 400 MCM | (2) 70.0 $mm^2$ (3/0 AWG) | 31.1 N•m (275 lb•in) |

(1) Maximum/minimum sizes that the terminal block will accept - these are not recommendations. If national or local codes require sizes outside the range, lugs may be used.

## Output Power Wiring

Refer to the PowerFlex 400 User Manual for additional detailed information about output power wiring recommendations and selection.

**ATTENTION:** Unused wires in conduit must be grounded at both ends to avoid a possible shock hazard caused by induced voltages. Also, if a drive sharing a conduit is being serviced or installed, all drives using this conduit should be disabled to eliminate the possible shock hazard from cross-coupled motor leads. Failure to observe these precautions could result in bodily injury.

**ATTENTION:** Do not route signal and control wiring with power wiring in the same conduit. This can cause interference with drive operation. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

To connect AC output power wiring from the drive to the motor:

❑ **1.** Wire the three-phase AC output power motor leads by routing them according to the drive option type. Note that you must punch openings in the option cabinet of the desired conduit size, following NEC and all applicable local codes and standards. Output power terminal block specifications are listed in Table 2.D.

Do not route more than three sets of motor leads through a single conduit. This will minimize cross-talk that could reduce the effectiveness of noise reduction methods. If more than three drive/motor connections per conduit are required, shielded cable must be used. If possible, each conduit should contain only one set of motor leads.

❑ **2.** Connect the three-phase AC output power motor leads to terminals T1, T2, T3 on the output power terminal block (TB2) located inside the option cabinet.

❑ **3.** Tighten the three-phase AC output power terminals to the proper torque according to drive type as shown in Table 2.D.

**Table 2.D Output Power Terminal Block Specification**

| Volts AC | kW | Hp | Maximum Wire Size(1) | Minimum Wire Size | Recommended Torque |
|---|---|---|---|---|---|
| 208V | 2.2...5.5 | 3.0...7.5 | 8.4 mm$^2$ (8 AWG) | 0.5 mm$^2$ (22 AWG) | 1.5 N•m (13 lb•in) |
| | 7.5...15 | 10...20 | 16.0 mm$^2$ (4 AWG) | 2.5 mm$^2$ (14 AWG) | 2.3 N•m (20 lb•in) |
| | 18.5...22 | 25...30 | 35.0 mm$^2$ (1/0 AWG) | 2.5 mm$^2$ (14 AWG) | 2.5 N•m (22 lb•in) |
| | 30...37 | 40...50 | 350 MCM | 10.0 mm$^2$ (6 AWG) | 31.1 N•m (275 lb•in) |
| 460V | 2.2...5.5 | 3.0...7.5 | 8.4 mm$^2$ (8 AWG) | 0.5 mm$^2$ (22 AWG) | 1.5 N•m (13 lb•in) |
| | 7.5...22 | 10...30 | 16.0 mm$^2$ (4 AWG) | 2.5 mm$^2$ (14 AWG) | 2.3 N•m (20 lb•in) |
| | 30...55 | 40...75 | 35.0 mm$^2$ (1/0 AWG) | 2.5 mm$^2$ (14 AWG) | 2.5 N•m (22 lb•in) |
| | 75 | 100 | 350 MCM | 10.0 mm$^2$ (6 AWG) | 31.1 N•m (275 lb•in) |
| | 90...110 | 125...150 | 350 MCM | 10.0 mm$^2$ (6 AWG) | 31.1 N•m (275 lb•in) |
| | 132...160 | 200...250 | 300 MCM | 107.2 mm$^2$ (4/0 AWG) | 29.4 N•m (260 lb•in) |
| | 200...250 | 300...350 | 500 MCM | 300 MCM | 40.0 N•m (354 lb•in) |

(1) Maximum/minimum sizes that the terminal block will accept - these are not recommendations. If national or local codes require sizes outside the range, lugs may be used.

## Control and Signal Wiring

Refer to the PowerFlex 400 User Manual for additional detailed information about control and signal wiring.

The Signal Terminal Block (TB1 Terminals 1…20 and R1…R6) located on the drive Main Control Board and Control Terminal Block (TB1 Terminals 31…40) located inside the Option Cabinet provide terminals for interfacing customer supplied control inputs and outputs. All analog and discrete control wiring will be made at these terminals. Typical customer control and signal wiring is shown on the Interconnect drawings, Figure 2.19 and Figure 2.22.

To connect control and signal wiring to the drive package:

❑ **1.** Wire the control and signal leads by routing them according to the drive option type. Note that you must punch openings in the option cabinet of the desired conduit size, following NEC and all applicable local codes and standards. Control and signal terminal block specifications are listed in Table 2.E.

Control and signal wires should be separated from power wires by at least 0.3 meters (1 foot).

❑ **2.** Connect the analog and relay output signal wiring to terminals 1…20 and R1…R6 located on the drive Main Control Board.

❑ **3.** Connect the control wiring listed below to terminals 31…40 located inside the Option Cabinet.

- Interlock
- Freeze/Fire Stats
- Autostart
- Bypass
- Purge
- Bypass Running

❑ **4.** Tighten the control and signal terminals to the proper torque according to drive type as shown in Table 2.E.

**Table 2.E Control and Signal Terminal Block Specifications**

| Voltage Rating | Terminals | Location | Maximum Wire Size(1) | Minimum Wire Size | Torque |
|---|---|---|---|---|---|
| 208…460V AC | 1…20, R1…R6 | Main Control Board | 1.3 $mm^2$ (16 AWG) | 0.13 $mm^2$ (26 AWG) | 0.5-0.8 N•m (4.4-7 lb•in) |
| | 31…40 | Option Cabinet | 4.0 $mm^2$ (10 AWG) | 0.5 $mm^2$ (22 AWG) | 0.6 N•m (5.0 lb•in) |

(1) Maximum/minimum sizes that the terminal block will accept - these are not recommendations.

## Customer Connections

The 3 Contactor Full Feature Bypass with Disconnect Package is set up to accommodate the following customer supplied contacts. Contacts should be rated for 120V AC.

### Interlock

The “Interlock” input functions as an Enable input when operating in either Drive or Bypass mode. Opening of the “Interlock” input (T31-T32) will prevent the drive/motor from running. T31-T32 are shipped jumpered together (with a jumper wire) from the factory. If it is desirable to use the “Interlock” input, this jumper wire can be removed and appropriate customer contacts wired in. If a valid “Autostart” or “Bypass” contact is present, the drive/motor will immediately run upon the closing of the “Interlock” input.

### Freeze/Fire Stat

The “Freeze/Fire Stat” input functions as a system fault input when operating in either Drive or Bypass mode. Opening of the “Freeze/Fire Stat” input (T31-T33) will prevent the drive/motor from running. T31-T33 are shipped jumpered together (with a jumper wire) from the factory. If it is desirable to use the “Freeze/Fire Stat” input, the jumper wire can be removed and appropriate customer contacts wired in. If the “Freeze/Fire Stat” input opens while operating in Drive mode, the drive will fault and require a manual reset to restart once the input closes. If the “Freeze/Fire Stat” input opens while operating in Bypass mode, the motor will coast to a stop and immediately run upon the re-closing of the input.

### Autostart

The “Autostart” input is used to remotely start the drive when SS1 is in the DRIVE position and SS2 is in the AUTO position. A closed input to terminals 34-35 will start the drive.

### Bypass

The “Bypass” input is used to remotely start the motor across the 3-phase AC line when SS1 is in the BYPASS position and SS2 is in the AUTO position. A closed input to terminals 34-36 will start the motor.
See Figure 2.2 for details on selector switch location.

### Purge

A “Purge” input can be wired to terminals 37-38. When this input is closed, the motor will run at the Purge Frequency, which is defined by Parameter A141 [Purge Frequency], assuming the following conditions exist.

- SS1 is either in the DRIVE or BYPASS position.
- SS2 is either in the HAND or AUTO position if Jumper P1 on the Bypass Control Panel (CP1) is in position A.
- SS2 is in the HAND, MOTOR OFF or AUTO position if Jumper P1 on the Bypass Control Panel (CP1) is in Position B.
- Interlock wired to terminals 31-32 is closed.
- Freeze/Fire Stat wired to terminals 31-33 is closed.

**ATTENTION:** A Purge command will take precedence over a Stop command from the Comm Port/Network. Insure that another stop method is available if stopping is necessary during a purge.

### Bypass Running

The “Bypass Running” contact is normally open. When the Bypass Contactor (BC) is closed the Bypass Running” contact will also be closed.

## Operating Modes

Selector Switch 1 (SS1) and Selector Switch 2 (SS2), located on the Bypass Control Panel (CP1), are used to determine the operating state of the 3 Contactor Full Feature Bypass with Disconnect Package. SS1 is used to select motor control:

- DRIVE = Drive keypad/terminal block controls the motor
- DRIVE TEST = Drive is powered but is not controlling the motor
- BYPASS = Motor runs across 3-Phase line

Jumper P2 on the Bypass Control Panel (CP1) allows the drive to be powered while running in bypass. This is accomplished by moving Jumper P2 to position B-C and turning SS1 from BYPASS to DRIVE TEST. If Jumper P2 is in position A-B, the drive cannot be powered while running in bypass. SS2 selects the source of the Start, Stop, and Drive Speed Reference as defined in Table 2.F.

**Table 2.F Command and Reference Selection**

| SS1(1) Selection | SS2(1) Selection | Start Command(2) | | | Stop Command | | | Drive Speed Reference(3) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | TB | Keypad | None | TB | Keypad | None | TB | Keypad | None |
| DRIVE | HAND | | • | | | • | | | • | |
| | MOTOR OFF | | | • | | | • | | | • |
| | AUTO | • | | | • | • | | • | | |
| DRIVE TEST | HAND | | • | | | • | | | • | |
| | MOTOR OFF | | | • | | | • | | | • |
| | AUTO | • | | | • | • | | • | | |
| BYPASS | HAND | Automatically Starts | | | Automatically Starts | | | Motor Runs at Base Speed | | |
| | MOTOR OFF | | | • | | | • | | | • |
| | AUTO | • | | | • | | | Motor Runs at Base Speed | | |

(1) See Figure 2.2 for details on selector switch location.

(2) When “Auto” is selected, the Start Command is defined by P036 [Start Source]. Factory default is configured for terminal block control. Refer to the PowerFlex 400 User Manual for other control schemes.

(3) When “Auto” is selected, the Speed Reference is defined by P038 [Speed Reference]. Analog In1 has control by factory default. Refer to the PowerFlex 400 User Manual for other control schemes.

# Parameter Defaults 3 Contactor Full Feature Bypass with Disconnect Package (Style B/N)

| Parameter Name | Number | Default |
|---|---|---|
| Output Freq | b001 | Read Only |
| Commanded Freq | b002 | Read Only |
| Output Current | b003 | Read Only |
| Output Voltage | b004 | Read Only |
| DC Bus Voltage | b005 | Read Only |
| Drive Status | b006 | Read Only |
| Fault 1 Code | b007 | Read Only |
| Process Display | b008 | Read Only |
| Output Power | b010 | Read Only |
| Elapsed MWh | b011 | Read Only |
| Elapsed Run Time | b012 | Read Only |
| Torque Current | b013 | Read Only |
| Drive Temp | b014 | Read Only |
| Elapsed kWh | b015 | Read Only |
| | | |
| Motor NP Volts | P031 | Drive Rated Volts |
| Motor NP Hertz | P032 | 60 Hz |
| Motor OL Current | P033 | Drive Rated Amps |
| Minimum Freq | P034 | 0.0 Hz |
| Maximum Freq | P035 | 60 Hz |
| Start Source | P036 | 6 "2-W Lvl/Enbl"(1) |
| Stop Mode | P037 | 1 "Coast, CF" |
| Speed Reference | P038 | 2 "Analog In1" |
| Accel Time 1 | P039 | 20.00 Secs |
| Decel Time 1 | P040 | 20.00 Secs |
| Reset To Defalts | P041 | 0 "Ready/Idle" |
| Auto Mode | P042 | 0 "No Function"(1) |
| | | |
| Digital In1 Sel | T051 | 1 "Purge" |
| Digital In2 Sel | T052 | 3 "Local" |
| Digital In3 Sel | T053 | 10 "Clear Fault" |
| Digital In4 Sel | T054 | 4 "Comm Port" |
| Relay Out1 Sel | T055 | 0 "Ready/Fault" |
| Relay Out1 Level | T056 | 0.0 |
| Relay 1 On Time | T058 | 0.0 Secs |
| Relay 1 Off Time | T059 | 0.0 Secs |
| Relay Out2 Sel | T060 | 2 "MotorRunning" |
| Relay Out2 Level | T061 | 0.0 |
| Relay 2 On Time | T063 | 0.0 Secs |
| Relay 2 Off Time | T064 | 0.0 Secs |
| Opto Out Sel | T065 | 1 "At Frequency" |
| Opto Out Level | T066 | 0.0 |
| Opto Out Logic | T068 | 0 "Normally Open" |
| Analog In 1 Sel | T069 | 2 "0-10V" |
| Analog In 1 Lo | T070 | 0.0% |
| Analog In 1 Hi | T071 | 100.0% |
| Analog In 1 Loss | T072 | 0 "Disabled" |
| Analog In 2 Sel | T073 | 1 "4-20 mA"(1) |
| Analog In 2 Lo | T074 | 0.0% |
| Analog In 2 Hi | T075 | 100.0% |
| Analog In 2 Loss | T076 | 0 "Disabled" |
| Sleep-Wake Sel | T077 | 0 "Disabled" |
| Sleep Level | T078 | 10.0% |
| Sleep Time | T079 | 0.0 Secs |
| Wake Level | T080 | 15.0% |
| Wake Time | T081 | 0.0 Secs |
| Analog Out1 Sel | T082 | 0 "OutFreq 0-10" |
| Analog Out1 High | T083 | 100% |
| Analog Out1 Setpt | T084 | 0.0% |
| Analog Out2 Sel | T085 | 1 "OutCurr 0-10" |
| Analog Out2 High | T086 | 100% |
| Analog Out2 Setpt | T087 | 0.0% |
| | | |
| Language | C101 | 1 "English" |
| Comm Format | C102 | 0 "RTU 8-N-1" |
| Comm Data Rate | C103 | 3 "9600" |
| Comm Node Addr | C104 | 100 |
| Comm Loss Action | C105 | 0 "Fault" |
| Comm Loss Time | C106 | 5.0 Secs |
| Comm Write Mode | C107 | 0 "Save" |
| | | |
| Purge Frequency | A141 | 5.0 Hz |
| Internal Freq | A142 | 60.00 Hz |
| Preset Freq 0 | A143 | 0.0 Hz |
| Preset Freq 1 | A144 | 5.0 Hz |
| Preset Freq 2 | A145 | 10.0 Hz |
| Preset Freq 3 | A146 | 20.0 Hz |
| Accel Time 2 | A147 | 30.00 Secs |
| Decel Time 2 | A148 | 30.00 Secs |
| S Curve % | A149 | 20% |
| PID Trim Hi | A150 | 60.0 Hz |
| PID Trim Lo | A151 | 0.0 Hz |
| PID Ref Sel | A152 | 0 "PID Disabled" |
| PID Feedback Sel | A153 | 0 "Analog In 1" |
| PID Prop Gain | A154 | 0.01 |
| PID Integ Time | A155 | 2.0 Secs |
| PID Diff Rate | A156 | 0.00 |
| PID Setpoint | A157 | 0.0% |
| PID Deadband | A158 | 0.0% |
| PID Preload | A159 | 0.0 Hz |
| Process Factor | A160 | 30.0 |
| Auto Rstrt Tries | A163 | 0 |
| Auto Rstrt Delay | A164 | 1.0 Secs |
| Start At PowerUp | A165 | 1 "Enabled"(1) |
| Reverse Disable | A166 | 1 "Rev Disabled" |
| Flying Start En | A167 | 1 "Enabled"(1) |
| PWM Frequency | A168 | 4.0 kHz |
| PWM Mode | A169 | 1 "2-Phase" |
| Boost Select | A170 | 4 "45.0, VT" |
| Start Boost | A171 | 2.5% |
| Break Voltage | A172 | 25.0% |
| Break Frequency | A173 | 15.0 Hz |
| Maximum Voltage | A174 | Drive Rated Volts |
| Slip Hertz @ FLA | A175 | 2.0 Hz |
| DC Brake Time | A176 | 0.0 Secs |
| DC Brake Level | A177 | Drive Rated Amps |
| DC Brk Time@Strt | A178 | 0 (Disabled) |
| Current Limit 1 | A179 | Drive Rated Amps |
| Current Limit 2 | A180 | Drive Rated Amps |
| Motor OL Select | A181 | 0 "No Derate" |
| Drive OL Mode | A182 | 3 "Both-PWM 1st" |
| SW Current Trip | A183 | 0.0 (Disabled) |
| Load Loss Level | A184 | 0.0 (Disabled) |
| Load Loss Time | A185 | 0 Secs |
| Stall Fault Time | A186 | 0 "60 Seconds" |
| Bus Reg Mode | A187 | 1 "Enabled" |
| Skip Frequency 1 | A188 | 0 Hz |
| Skip Freq Band 1 | A189 | 0.0 Hz |
| Skip Frequency 2 | A190 | 0 Hz |
| Skip Freq Band 2 | A191 | 0.0 Hz |
| Skip Frequency 3 | A192 | 0 Hz |
| Skip Freq Band 3 | A193 | 0.0 Hz |
| Compensation | A194 | 1 "Electrical" |
| Reset Meters | A195 | 0 "Ready/Idle" |
| Testpoint Sel | A196 | 400 |
| Fault Clear | A197 | 0 "Ready/Idle" |
| Program Lock | A198 | 0 "Unlocked" |
| Motor NP Poles | A199 | 4 |
| | | |
| Relay Out3 Sel | R221 | 0 "Ready/Fault" |
| Relay Out3 Level | R222 | 0.0 |
| Relay Out4 Sel | R224 | 0 "Ready/Fault" |
| Relay Out4 Level | R225 | 0.0 |
| Relay Out5 Sel | R227 | 0 "Ready/Fault" |
| Relay Out5 Level | R228 | 0.0 |
| Relay Out6 Sel | R230 | 0 "Ready/Fault" |
| Relay Out6 Level | R231 | 0.0 |
| Relay Out7 Sel | R233 | 0 "Ready/Fault" |
| Relay Out7 Level | R234 | 0.0 |
| Relay Out8 Sel | R236 | 0 "Ready/Fault" |
| Relay Out8 Level | R237 | 0.0 |
| Aux Motor Mode | R239 | 0 "Disabled" |
| Aux Motor Qty | R240 | 1 "1 Aux Mtr" |
| Aux 1 Start Freq | R241 | 50.0 Hz |
| Aux 1 Stop Freq | R242 | 25.0 Hz |
| Aux 1 Ref Add | R243 | 0.0% |
| Aux 2 Start Freq | R244 | 50.0 Hz |
| Aux 2 Stop Freq | R245 | 25.0 Hz |
| Aux 2 Ref Add | R246 | 0.0% |
| Aux 3 Start Freq | R247 | 50.0 Hz |
| Aux 3 Stop Freq | R248 | 25.0 Hz |
| Aux 3 Ref Add | R249 | 0.0% |
| Aux Start Delay | R250 | 5.0 Secs |
| Aux Stop Delay | R251 | 3.0 Secs |
| Aux Prog Delay | R252 | 0.50 Secs |
| Aux AutoSwap Tme | R253 | 0.0 Hr |
| Aux AutoSwap Lvl | R254 | 50.0% |
| | | |
| Control Source | d301 | Read Only |
| Contrl In Status | d302 | Read Only |
| Comm Status | d303 | Read Only |
| PID Setpnt Displ | d304 | Read Only |
| Analog In 1 | d305 | Read Only |
| Analog In 2 | d306 | Read Only |
| Fault 1 Code | d307 | Read Only |
| Fault 2 Code | d308 | Read Only |
| Fault 3 Code | d309 | Read Only |
| Fault 1 Time-hr | d310 | Read Only |
| Fault 1 Time-min | d311 | Read Only |
| Fault 2 Time-hr | d312 | Read Only |
| Fault 2 Time-min | d313 | Read Only |
| Fault 3 Time-hr | d314 | Read Only |
| Fault 3 Time-min | d315 | Read Only |
| Elapsed Time-hr | d316 | Read Only |
| Elapsed Time-min | d317 | Read Only |
| Output Powr Fctr | d318 | Read Only |
| Testpoint Data | d319 | Read Only |
| Control SW Ver | d320 | Read Only |
| Drive Type | d321 | Read Only |
| Output Speed | d322 | Read Only |
| Output RPM | d323 | Read Only |
| Fault Frequency | d324 | Read Only |
| Fault Current | d325 | Read Only |
| Fault Bus Volts | d326 | Read Only |
| Status @ Fault | d327 | Read Only |

(1) The default values of these parameters differ from Factory Defaults. Setting P041 [Reset To Defalts] to 1 "Factory Rset" will change these parameter settings to the defaults listed in the PowerFlex 400 User Manual.

**ATTENTION:** Parameter A165 [Start At PowerUp] ships from the factory enabled. This feature allows a Run command to automatically cause the drive to resume running at commanded speed after drive input power is restored. Equipment damage and/or personal injury may result if this parameter is used in an inappropriate application. Do not use this function without considering applicable local, national and international codes, standards, regulations or industry guidelines.

## Drawing Index

## 208V AC – 3 Contactor Full Feature Bypass with Disconnect Package (Style B/N)

| Input Voltage | Type | Hp | Input Line Reactor | Drawing | | | | | | | | Hp |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Schematic | *Page* | Interconnect | *Page* | Layout | *Page* | Outline | *Page* | |
| 208V AC | NEMA/UL Type 1 | 3 | No | 98D00705 | 2-15 | 97D00704 | 2-31 | 95D00761 | 2-37 | 95D00719 | 2-71 | 3 |
| | | 5 | | | | | | | | | | 5 |
| | | 7.5 | | | | | | 95D00762 | 2-38 | 95D00698 | 2-72 | 7.5 |
| | | 10 | | | | | | | | | | 10 |
| | | 15 | | | | | | 95D00763 | 2-39 | 95D00700 | 2-73 | 15 |
| | | 20 | | | | | | | | | | 20 |
| | | 25 | | | | | | 95D00777 | 2-40 | 95D00701 | 2-74 | 25 |
| | | 30 | | | | | | | | | | 30 |
| | | 40 | | | | | | 95D00765 | 2-42 | 95D00702 | 2-75 | 40 |
| | | 50 | | | | | | 95D00778 | 2-43 | 95D00703 | 2-76 | 50 |
| | | 3 | Yes | 98D00757 | 2-21 | 97D00755 | 2-34 | 95D00793 | 2-47 | 95D00720 | 2-80 | 3 |
| | | 5 | | | | | | | | | | 5 |
| | | 7.5 | | | | | | 95D00794 | 2-48 | 95D00699 | 2-81 | 7.5 |
| | | 10 | | | | | | | | | | 10 |
| | | 15 | | | | | | 95D01371 | 2-49 | 95D01363 | 2-82 | 15 |
| | | 20 | | | | | | | | | | 20 |
| | | 25 | | | | | | 95D01372 | 2-50 | 95D01364 | 2-83 | 25 |
| | | 30 | | | | | | 95D01377 | 2-52 | | | 30 |
| | | 40 | | | | | | 95D01374 | 2-53 | 95D01366 | 2-85 | 40 |
| | | 50 | | | | | | | | | | 50 |
| | NEMA/UL Type 12 | 3 | With or Without | 98D01541 | 2-23 | 97D01549 | 2-35 | 95D01580 | 2-54 | 95D01552 | 2-86 | 3 |
| | | 5 | | | | | | | | | | 5 |
| | | 7.5 | | | | | | | | | | 7.5 |
| | | 10 | | | | | | | | | | 10 |
| | | 15 | | | | | | 95D01581 | 2-55 | | | 15 |
| | | 20 | | | | | | | | | | 20 |
| | | 25 | | | | | | 95D01582 | 2-56 | | | 25 |
| | | 30 | | | | | | | | | | 30 |
| | | 40 | | | | | | 95D01583 | 2-57 | | | 40 |
| | | 50 | | | | | | | | | | 50 |
| | NEMA/UL Type 4 | 3 | With or Without | 98D01539 | 2-25 | 97D01549 | 2-35 | 95D01569 | 2-60 | 95D01551 | 2-87 | 3 |
| | | 5 | | | | | | | | | | 5 |
| | | 7.5 | | | | | | | | | | 7.5 |
| | | 10 | | | | | | | | | | 10 |
| | | 15 | | | | | | 95D01570 | 2-61 | | | 15 |
| | | 20 | | | | | | 95D01571 | 2-62 | | | 20 |
| | | 25 | | | | | | 95D01572 | 2-63 | | | 25 |
| | | 30 | | | | | | | | | | 30 |
| | | 40 | | | | | | 95D01573 | 2-64 | | | 40 |
| | | 50 | | | | | | | | | | 50 |
| | NEMA/UL Type 3R | 3 | With or Without | 98D01536 | 2-29 | 97D01549 | 2-35 | 95D01558 | 2-66 | 95D01550 | 2-88 | 3 |
| | | 5 | | | | | | | | | | 5 |
| | | 7.5 | | | | | | | | | | 7.5 |
| | | 10 | | | | | | | | | | 10 |
| | | 15 | | | | | | 95D01559 | 2-67 | | | 15 |
| | | 20 | | | | | | | | | | 20 |
| | | 25 | | | | | | | | | | 25 |
| | | 30 | | | | | | | | | | 30 |
| | | 40 | | | | | | 95D01561 | 2-69 | | | 40 |
| | | 50 | | | | | | | | | | 50 |

## 460V AC – 3 Contactor Full Feature Bypass with Disconnect Package (Style B/N)

| Input Voltage | Type | Hp | Input Line Reactor | Drawing | | | | | | | | Hp |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Schematic | *Page* | Interconnect | *Page* | Layout | *Page* | Outline | *Page* | |
| 460V AC | NEMA/UL Type 1 | 3 | No | 98D00705 | 2-15 | 97D00704 | 2-31 | 95D00761 | 2-37 | 95D00719 | 2-71 | 3 |
| | | 5 | | | | | | | | | | 5 |
| | | 7.5 | | | | | | | | | | 7.5 |
| | | 10 | | | | | | | | | | 10 |
| | | 15 | | | | | | 95D00762 | 2-38 | 95D00698 | 2-72 | 15 |
| | | 20 | | | | | | | | | | 20 |
| | | 25 | | | | | | 95D00763 | 2-39 | 95D00700 | 2-73 | 25 |
| | | 30 | | | | | | | | | | 30 |
| | | 40 | | | | | | | | | | 40 |
| | | 50 | | | | | | 95D00764 | 2-41 | 95D00702 | 2-75 | 50 |
| | | 60 | | | | | | | | | | 60 |
| | | 75 | | | | | | | | | | 75 |
| | | 100 | | | | | | 95D00765 | 2-42 | | | 100 |
| | | 125 | | | | | | 95D01263 | 2-44 | 95D01265 | 2-77 | 125 |
| | | 150 | | | | | | | | | | 150 |
| | | 200 | | 98D01861 | 2-17 | 97D01892 | 2-32 | 95D01863 | 2-45 | 95D01867 | 2-78 | 200 |
| | | 250 | | 98D01860 | 2-19 | 97D01891 | 2-36 | | | | | 250 |
| | | 300 | | | | | | 95D01865 | 2-46 | 95D01869 | 2-79 | 300 |
| | | 350 | | | | | | | | | | 350 |
| | | 3 | Yes | 98D00757 | 2-21 | 97D00755 | 2-34 | 95D00793 | 2-47 | 95D00720 | 2-80 | 3 |
| | | 5 | | | | | | | | | | 5 |
| | | 7.5 | | | | | | | | | | 7.5 |
| | | 10 | | | | | | | | | | 10 |
| | | 15 | | | | | | 95D00794 | 2-48 | 95D00699 | 2-81 | 15 |
| | | 20 | | | | | | | | | | 20 |
| | | 25 | | | | | | 95D01371 | 2-49 | 95D01363 | 2-82 | 25 |
| | | 30 | | | | | | | | | | 30 |
| | | 40 | | | | | | | | | | 40 |
| | | 50 | | | | | | 95D01373 | 2-51 | 95D01365 | 2-84 | 50 |
| | | 60 | | | | | | | | | | 60 |
| | | 75 | | | | | | 95D01374 | 2-53 | 95D01366 | 2-85 | 75 |
| | | 100 | | | | | | | | | | 100 |
| 460V AC | NEMA/UL Type 12 | 3 | With or Without | 98D01541 | 2-23 | 97D01549 | 2-35 | 95D01580 | 2-54 | 95D01552 | 2-86 | 3 |
| | | 5 | | | | | | | | | | 5 |
| | | 7.5 | | | | | | | | | | 7.5 |
| | | 10 | | | | | | | | | | 10 |
| | | 15 | | | | | | | | | | 15 |
| | | 20 | | | | | | | | | | 20 |
| | | 25 | | | | | | 95D01581 | 2-55 | | | 25 |
| | | 30 | | | | | | | | | | 30 |
| | | 40 | | | | | | | | | | 40 |
| | | 50 | | | | | | 95D01582 | 2-56 | | | 50 |
| | | 60 | | | | | | | | | | 60 |
| | | 75 | | | | | | 95D01583 | 2-57 | | | 75 |
| | | 100 | | | | | | | | | | 100 |
| | | 125 | | | | | | 95D01584 | 2-58 | | | 125 |
| | | 150 | | | | | | | | | | 150 |

| Input Voltage | Type | Hp | Input Line Reactor | Drawing | | | | | | | | Hp |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Schematic | *Page* | Interconnect | *Page* | Layout | *Page* | Outline | *Page* | |
| 460V AC | NEMA/UL Type 4 | 3 | With or Without | 98D01539 | 2-25 | 97D01549 | 2-35 | 95D02443 | 2-59 | 95D01551 | 2-87 | 3 |
| | | 5 | | | | | | | | | | 5 |
| | | 7.5 | | | | | | 95D01569 | 2-60 | | | 7.5 |
| | | 10 | | | | | | | | | | 10 |
| | | 15 | | | | | | | | | | 15 |
| | | 20 | | | | | | | | | | 20 |
| | | 25 | | | | | | 95D01570 | 2-61 | | | 25 |
| | | 30 | | | | | | 95D01571 | 2-62 | | | 30 |
| | | 40 | | | | | | | | | | 40 |
| | | 50 | | | | | | 95D01572 | 2-63 | | | 50 |
| | | 60 | | | | | | | | | | 60 |
| | | 75 | | | | | | 95D01573 | 2-64 | | | 75 |
| | | 100 | | | | | | | | | | 100 |
| | | 125 | | 98D01540 | 2-27 | | | 95D01574 | 2-65 | | | 125 |
| | | 150 | | | | | | | | | | 150 |
| 460V AC | NEMA/UL Type 3R | 3 | With or Without | 98D01536 | 2-29 | 97D01549 | 2-35 | 95D01558 | 2-66 | 95D01550 | 2-88 | 3 |
| | | 5 | | | | | | | | | | 5 |
| | | 7.5 | | | | | | | | | | 7.5 |
| | | 10 | | | | | | | | | | 10 |
| | | 15 | | | | | | | | | | 15 |
| | | 20 | | | | | | | | | | 20 |
| | | 25 | | | | | | 95D01559 | 2-67 | | | 25 |
| | | 30 | | | | | | | | | | 30 |
| | | 40 | | | | | | | | | | 40 |
| | | 50 | | | | | | 95D01560 | 2-68 | | | 50 |
| | | 60 | | | | | | | | | | 60 |
| | | 75 | | | | | | 95D01561 | 2-69 | | | 75 |
| | | 100 | | | | | | | | | | 100 |
| | | 125 | | | | | | 95D01562 | 2-70 | | | 125 |
| | | 150 | | | | | | | | | | 150 |

## Schematic Drawings

**Figure 2.3 3.0…50 Hp, 208V AC & 3.0…150 Hp, 460V AC Drives (Sheet 1 of 2) - NEMA/UL Type 1**

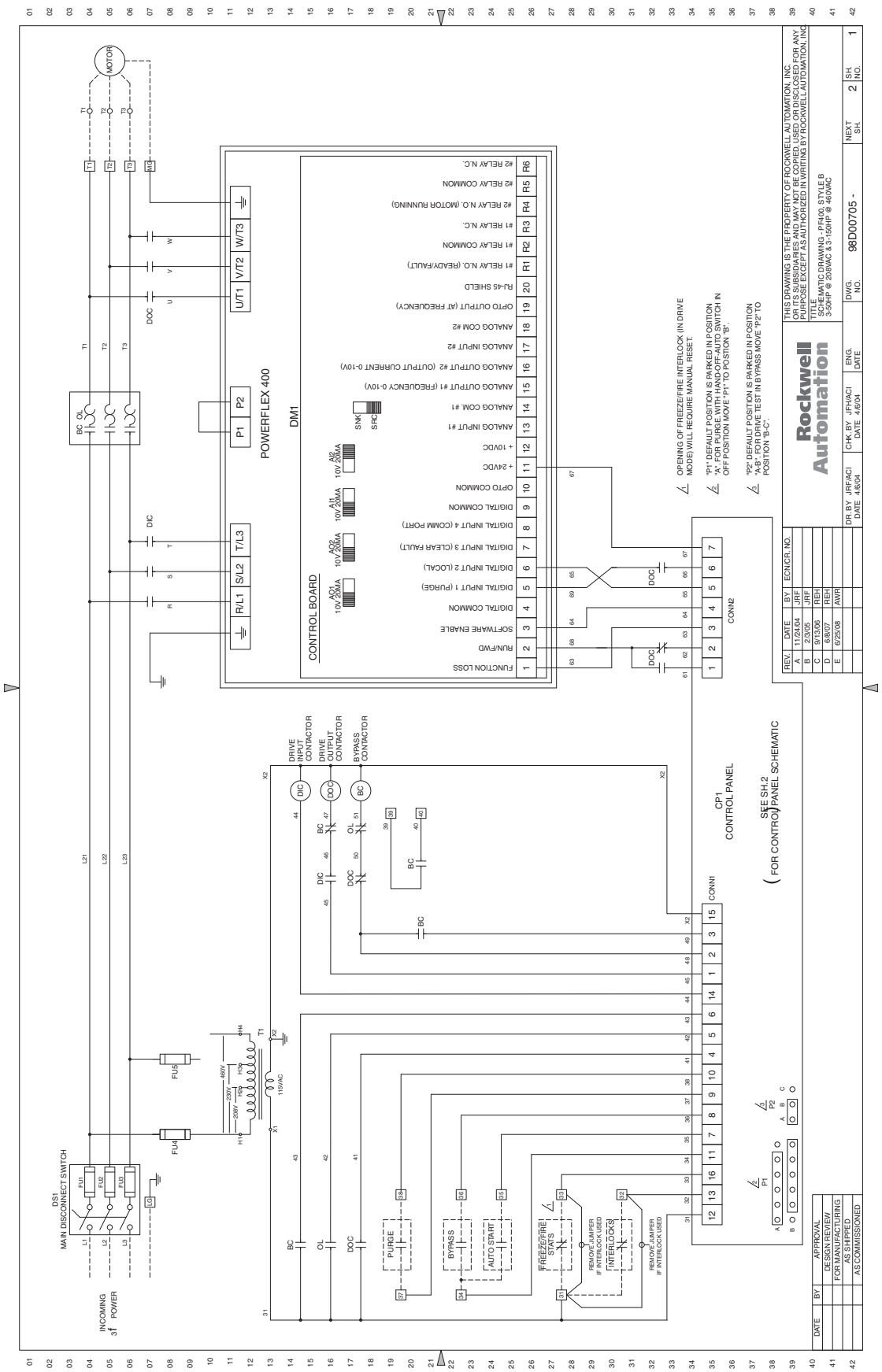


**Figure 2.4 3.0…50 Hp, 208V AC & 3.0…150 Hp, 460V AC Drives (Sheet 2 of 2) - NEMA/UL Type 1**

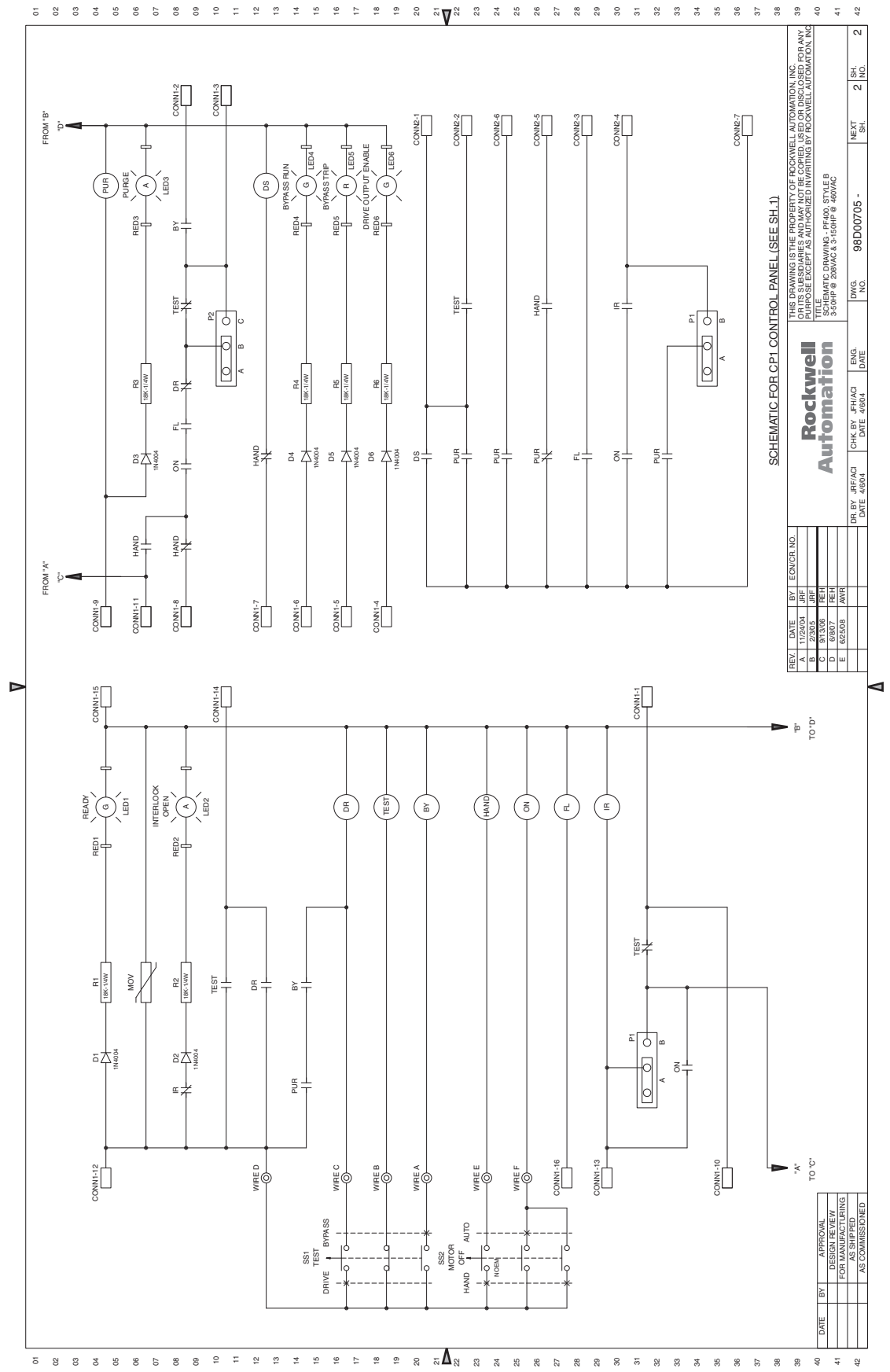


**Figure 2.5 200 Hp, 460V AC Drives (Sheet 1 of 2) - NEMA/UL Type 1**

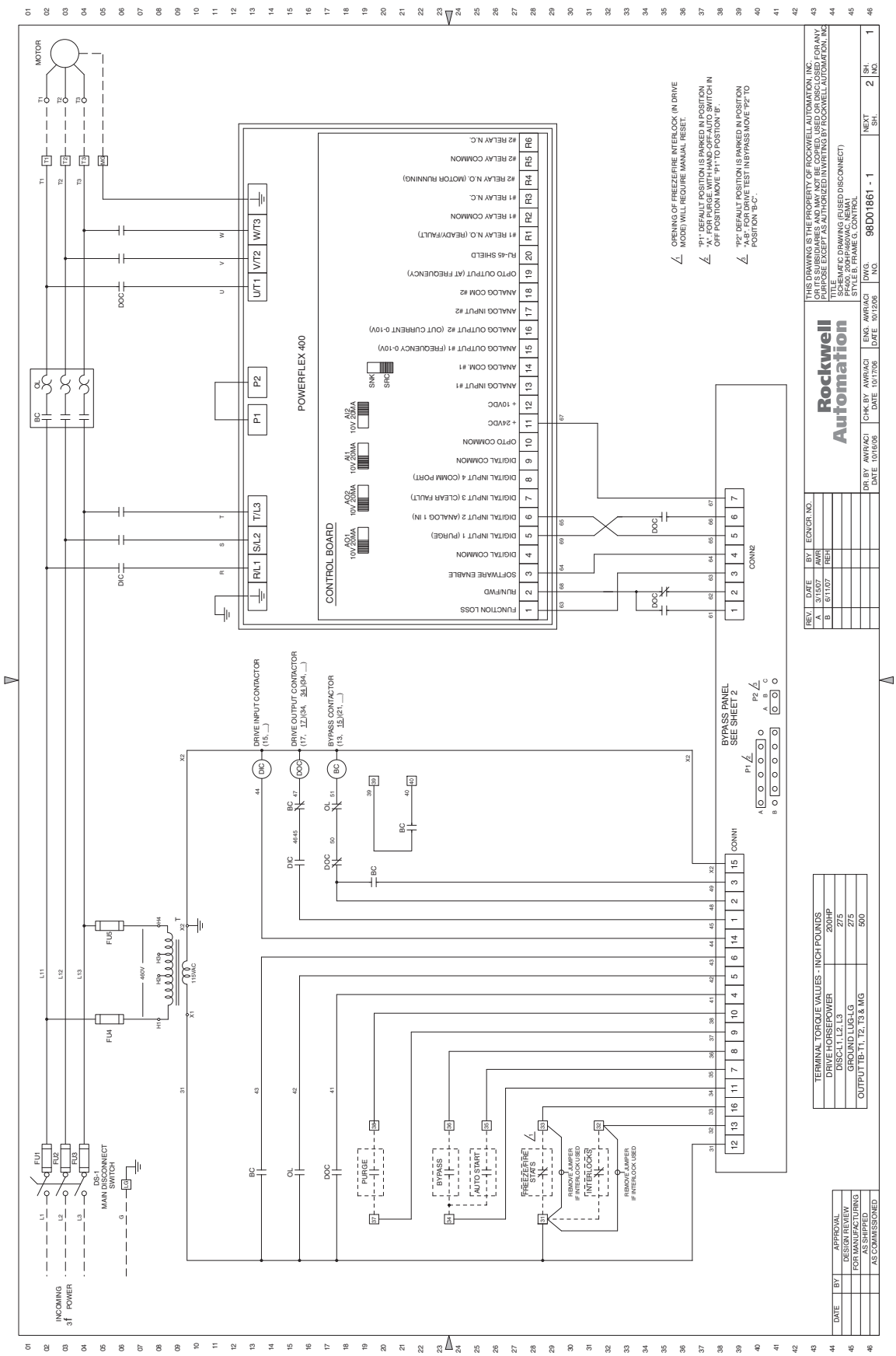

MOTOR
POWERFLEX 400
CONTROL BOARD
BYPASS PANEL SEE SHEET 2
CONN1
CONN2
DRIVE INPUT CONTACTOR
DRIVE OUTPUT CONTACTOR
BYPASS CONTACTOR
INCOMING 3f POWER
MAIN DISCONNECT SWITCH
PURGE
BYPASS
AUTO START
FREEZE/FIRE STATS
INTERLOCKS
REMOVE JUMPER IF INTERLOCK USED
OPENING OF FREEZE/FIRE INTERLOCK (IN DRIVE MODE) WILL REQUIRE MANUAL RESET.
"P1" DEFAULT POSITION IS PARKED IN POSITION "A". FOR PURGE, WITH HAND-OFF-AUTO SWITCH IN OFF POSITION MOVE "P1" TO POSITION "B".
"P2" DEFAULT POSITION IS PARKED IN POSITION "A". AFTER DRIVE TEST IN BYPASS MOVE "P2" TO POSITION "B"&"C".
Rockwell Automation
THIS DRAWING IS THE PROPERTY OF ROCKWELL AUTOMATION, INC. OR ITS SUBSIDIARIES AND MAY NOT BE COPIED, USED OR DISCLOSED FOR ANY PURPOSE EXCEPT AS AUTHORIZED IN WRITING BY ROCKWELL AUTOMATION, INC.
TITLE: SCHEMATIC DRAWING (FUSED DISCONNECT) PF400, 200HP/460VAC, NEMA1 STYLE: B FRAME G, CONTROL
DWG. NO. 98D01861 - 1
NEXT SH. 2
SH. NO. 1
TERMINAL TORQUE VALUES - INCH POUNDS
DRIVE HORSEPOWER 200HP
DISC-L1, L2, L3 275
GROUND LUG-LG 275
OUTPUT TB-T1, T2, T3 & MG 500
APPROVAL
DESIGN REVIEW
FOR MANUFACTURING AS RELEASED
AS COMMISSIONED

**Figure 2.6 200 Hp, 460V AC Drives (Sheet 2 of 2) - NEMA/UL Type 1**

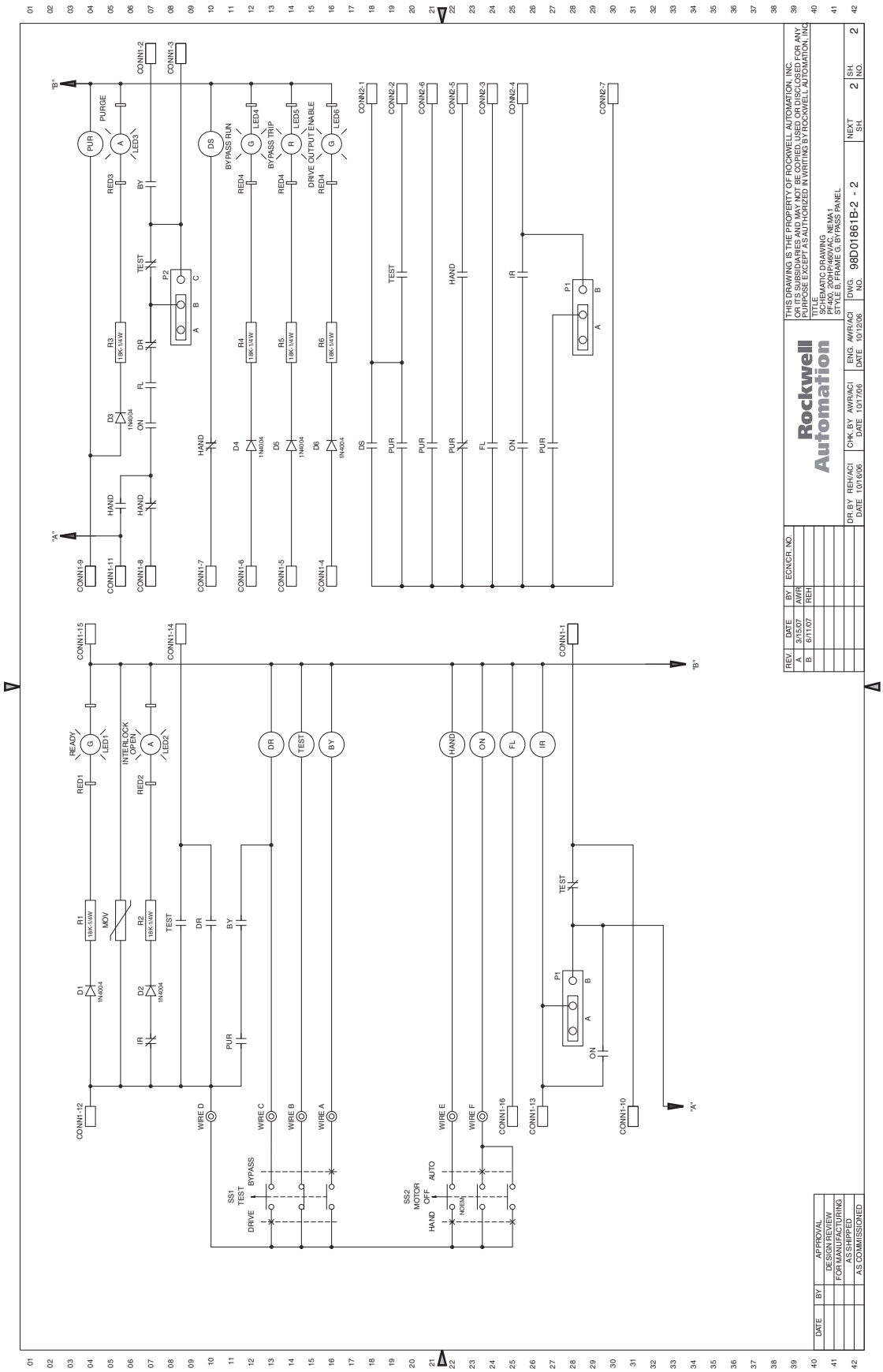


**Figure 2.7 250…350 Hp, 460V AC Drives (Sheet 1 of 2) - NEMA/UL Type 1**

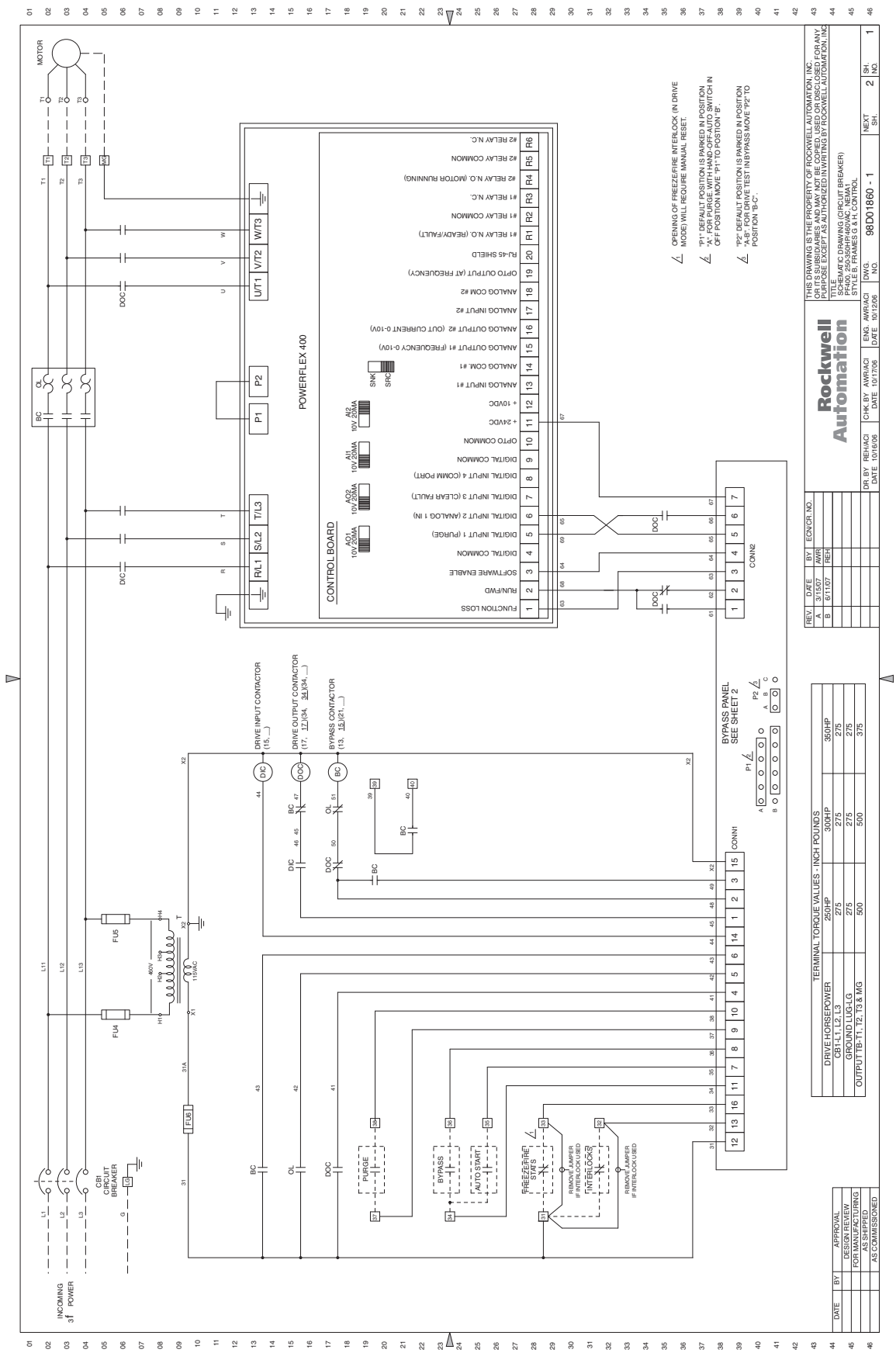


**Figure 2.8 250…350 Hp, 460V AC Drives (Sheet 2 of 2) - NEMA/UL Type 1**

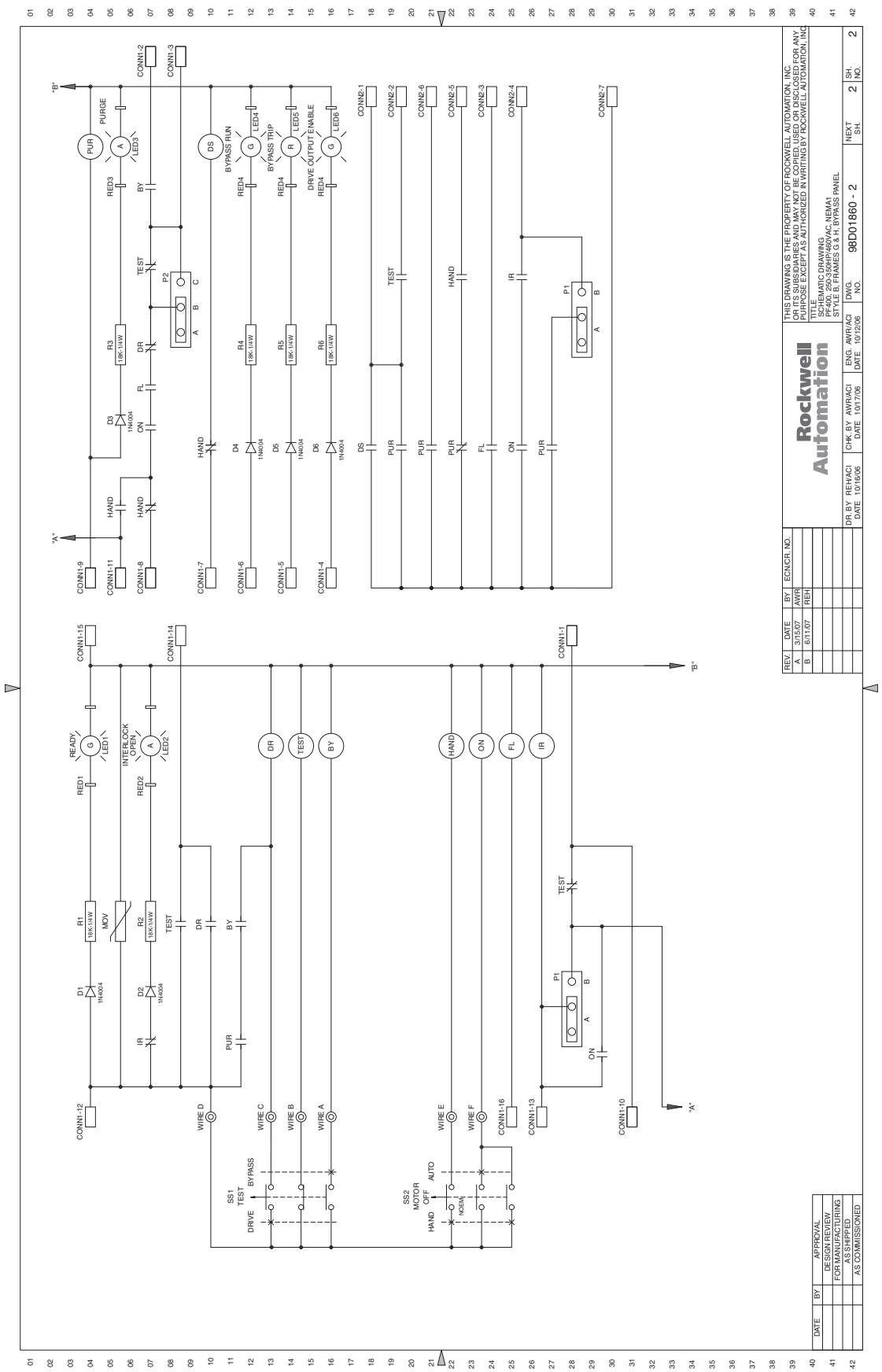


**Figure 2.9 3.0…50 Hp, 208V AC & 3.0…100 Hp, 460V AC Drives with Line Reactor (Sheet 1 of 2) - NEMA/UL Type 1**

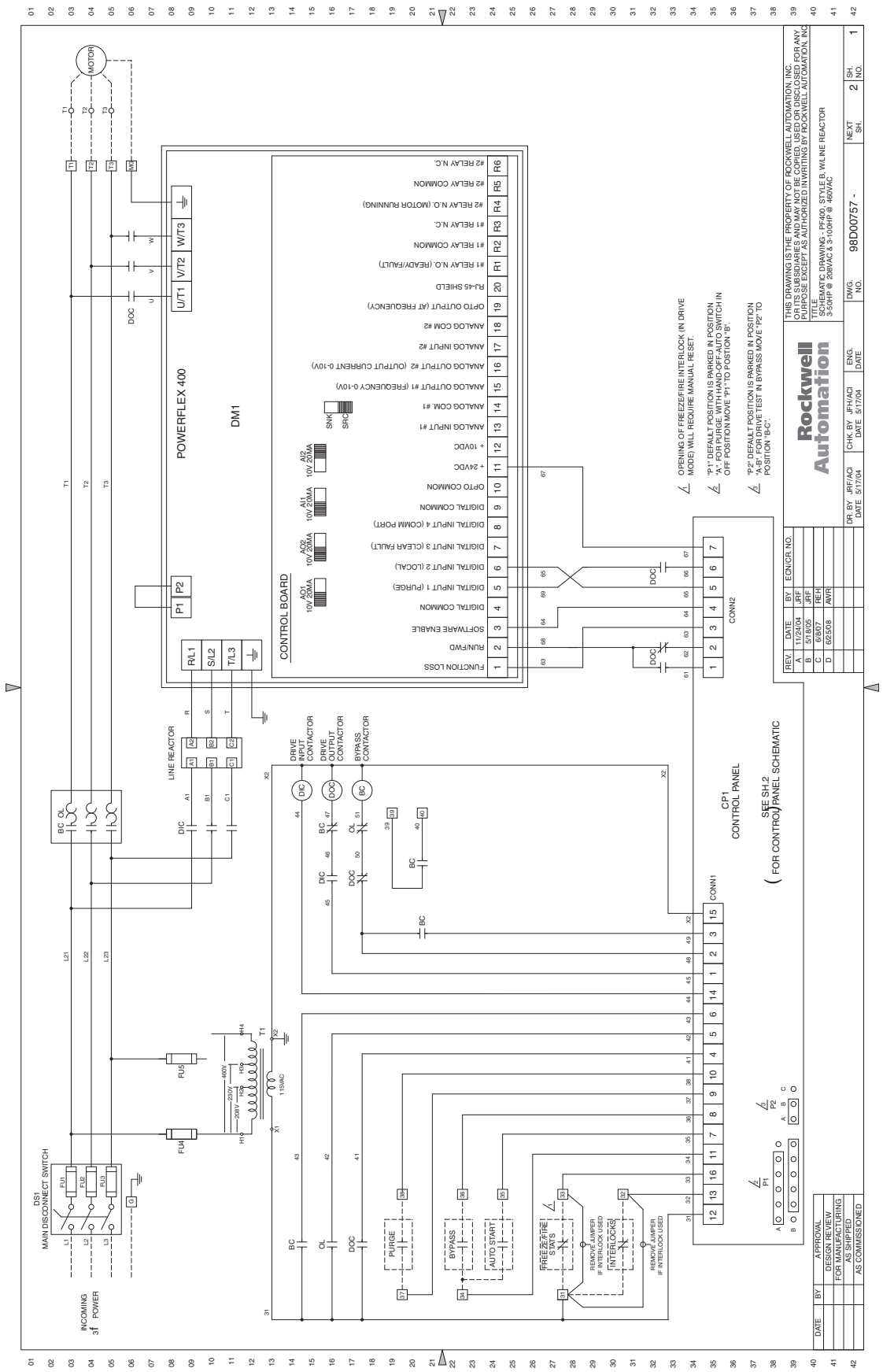


**Figure 2.10 3.0…50 Hp, 208V AC & 3.0…100 Hp, 460V AC Drives with Line Reactor (Sheet 2 of 2) - NEMA/UL Type 1**

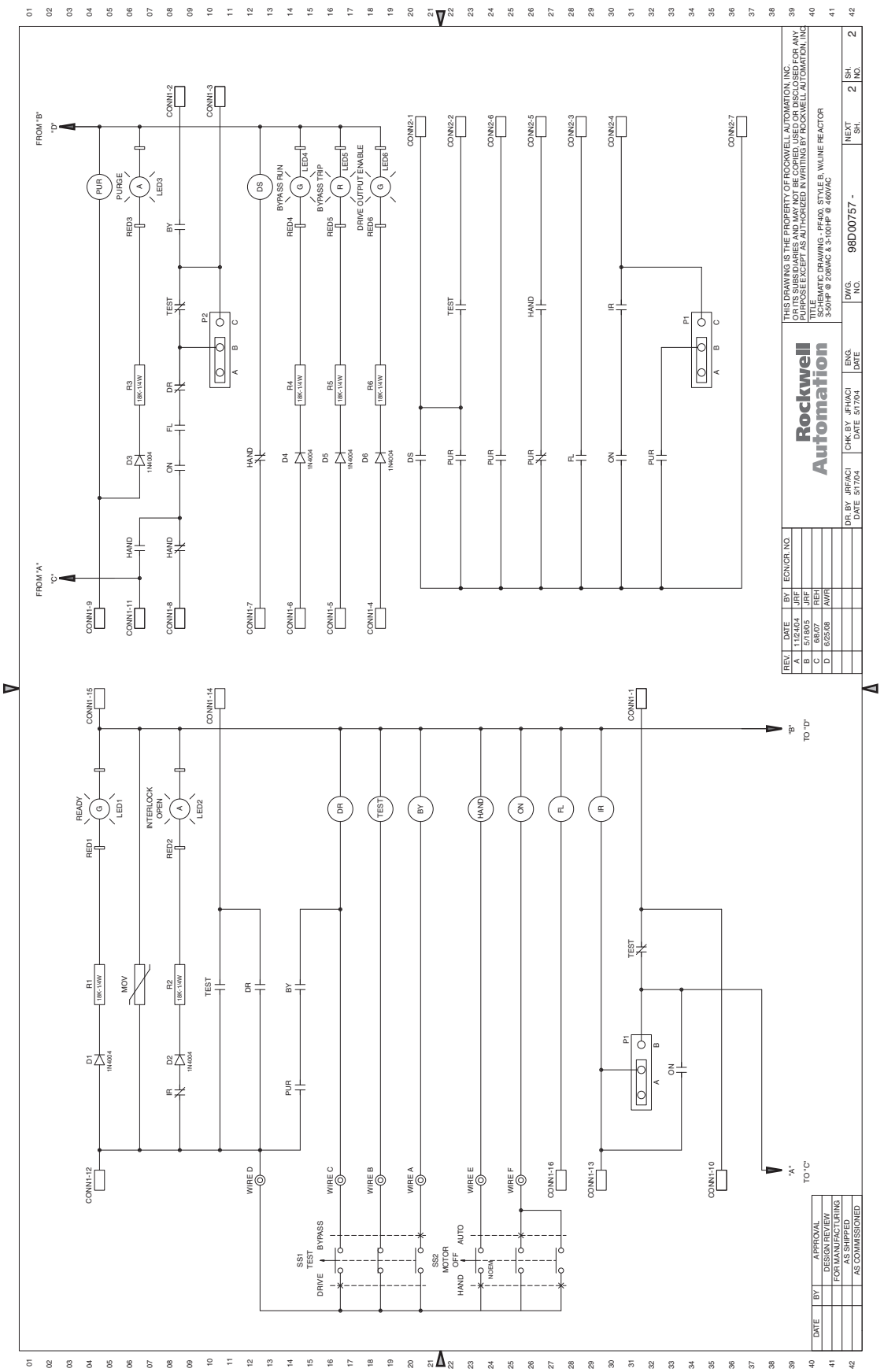
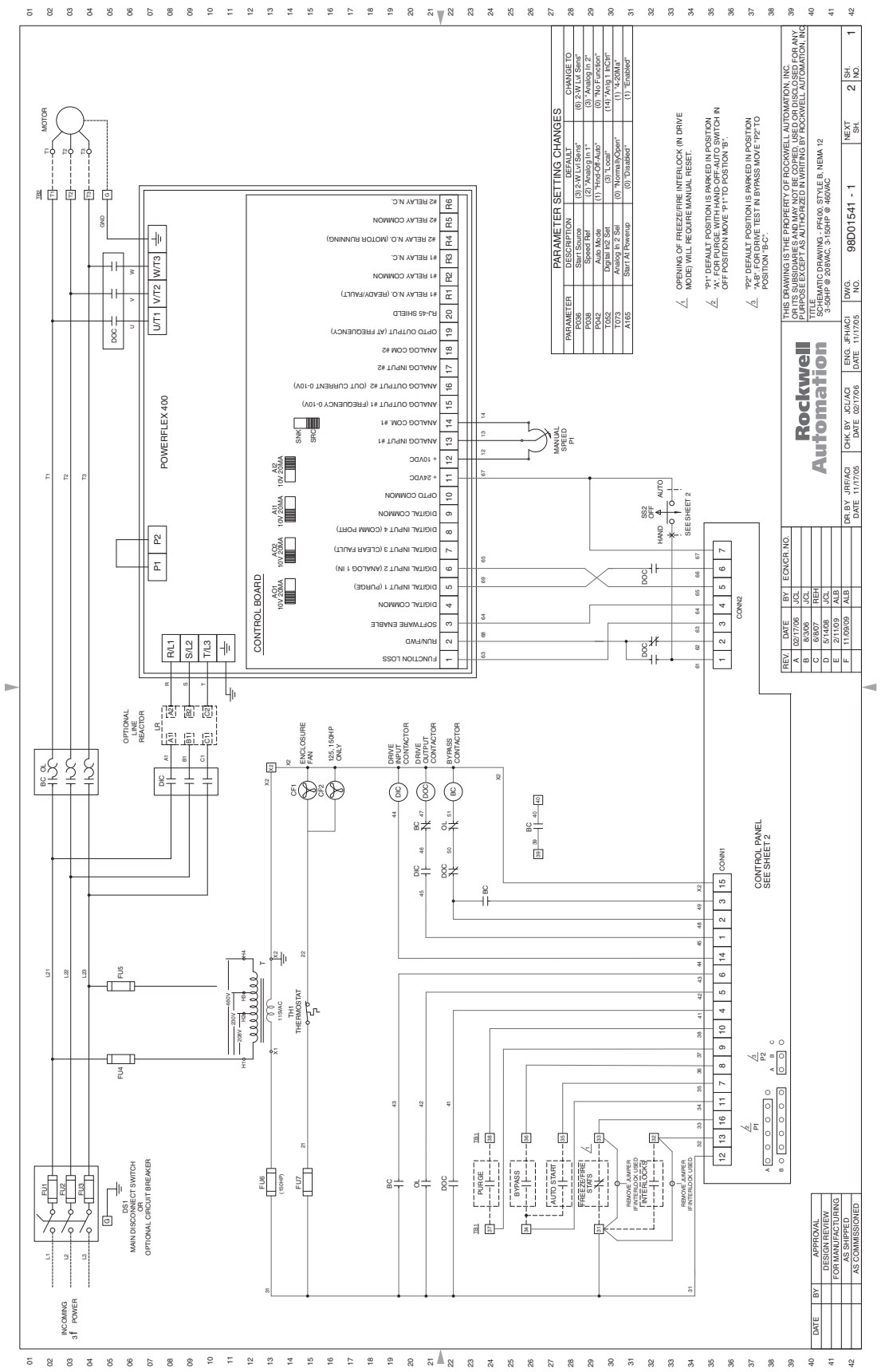


**Figure 2.11 3.0...50 Hp, 208V AC & 3.0...150 Hp, 460V AC Drives (Sheet 1 of 2) - NEMA/UL Type 12**


PARAMETER SETTING CHANGES
PARAMETER | DESCRIPTION | DEFAULT | CHANGE TO
P036 | Start Source | (3) 2-W Lvl Sens* | (6) 2-W Lvl Sens*
P038 | Speed Ref | (2) "Analog In 1" | (3) "Analog In 2"
P042 | Auto Mode | (1) "Hmd-Off-Auto" | (0) "Not Function"
T052 | Digital In 2 Sel | (3) "Local" | (14) "Anlg 1 Hi/Lo"
T053 | Analog In 2 Sel | (0) "Not Used" | (1) "0-10VDC"
A165 | Start At Powerup | (0) "Disabled" | (1) "Enabled"
OPENING OF FREEZE/FIRE INTERLOCK (IN DRIVE MODE) WILL REQUIRE MANUAL RESET.
"P1" DEFAULT POSITION IS PARKED IN POSITION "A". FOR PURGE WITH HAND-OFF-AUTO SWITCH IN OFF POSITION MOVE "P1" TO POSITION "B".
"P2" DEFAULT POSITION IS PARKED IN POSITION "A-B". FOR DRIVE TEST IN BYPASS MOVE "P2" TO POSITION "B-C".
POWERFLEX 400
CONTROL BOARD
CONTROL PANEL SEE SHEET 2
SEE SHEET 2
MOTOR
MANUAL SPEED P1
OPTIONAL LINE REACTOR
ENCLOSURE FAN
DRIVE INPUT CONTACTOR
DRIVE OUTPUT CONTACTOR
BYPASS CONTACTOR
THERMOSTAT
PURGE
BYPASS
AUTO START
FREEZE/FIRE STATS
REMOVE JUMPER IF INTERLOCK USED
MAIN DISCONNECT SWITCH OR OPTIONAL CIRCUIT BREAKER
INCOMING 3 Ø POWER
Rockwell Automation
DR. BY JRF/ACI DATE 11/17/05
CHK. BY JCL/ACI DATE 02/17/06
ENG. JFH/ACI DATE 11/17/05
DWG. NO. 98D01541 - 1
TITLE SCHEMATIC DRAWING - PR400, STYLE B, NEMA 12 3-50HP @ 208VAC, 3-150HP @ 460VAC
NEXT SH. 2
SH. NO. 1
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REV | DATE | BY | ECN/CR NO.
A | 02/17/06 | JCL
B | 8/30/06 | JCL
C | 6/8/07 | REH
D | 5/14/08 | JCL
E | 2/11/09 | ALB
F | 11/09/09 | ALB
DATE | BY | APPROVAL
DESIGN REVIEW
FOR MANUFACTURING
AS SHIPPED
AS COMMISSIONED

**Figure 2.12 3.0…50 Hp, 208V AC & 3.0…150 Hp, 460V AC Drives (Sheet 2 of 2) - NEMA/UL Type 12**

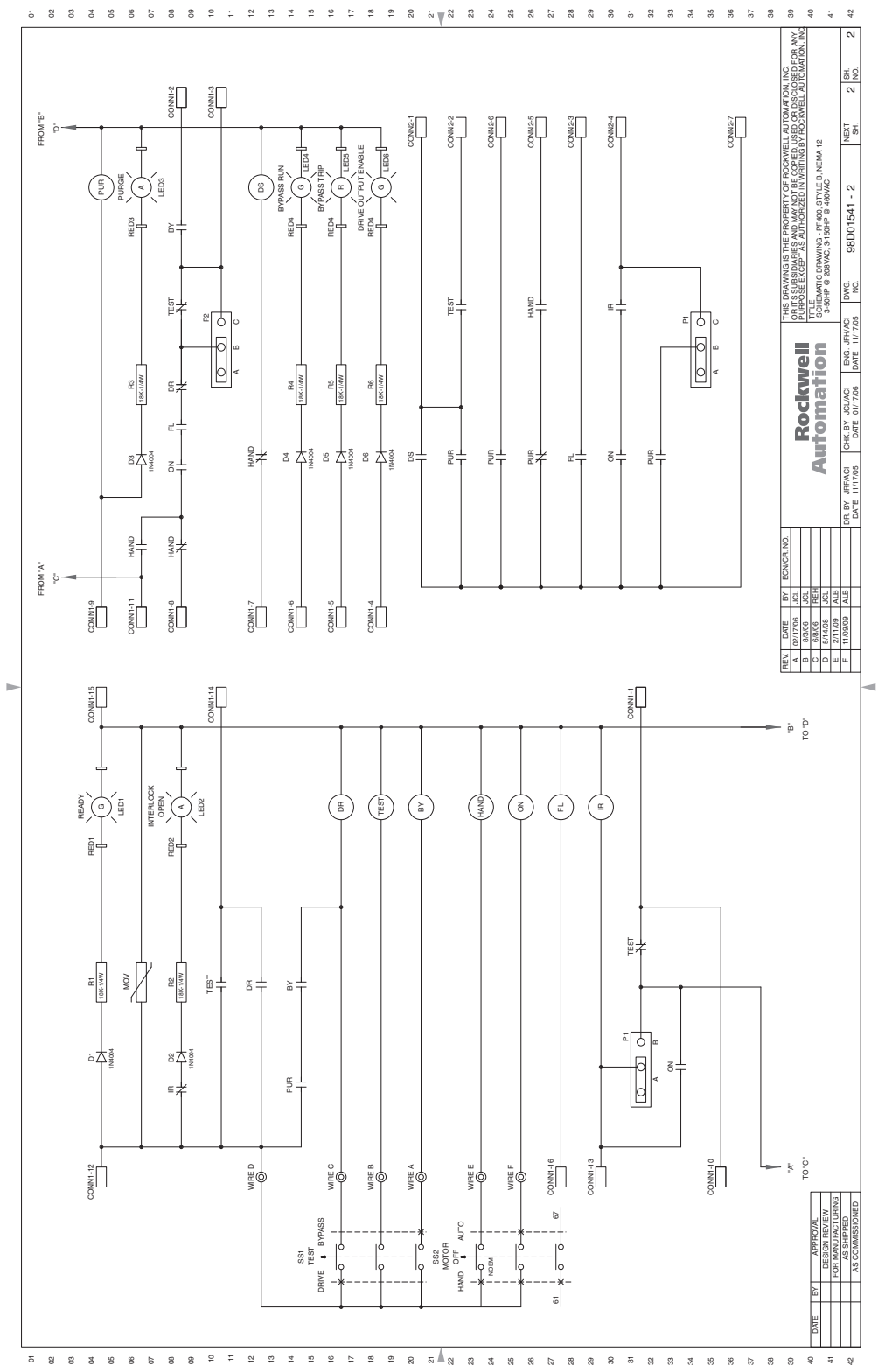
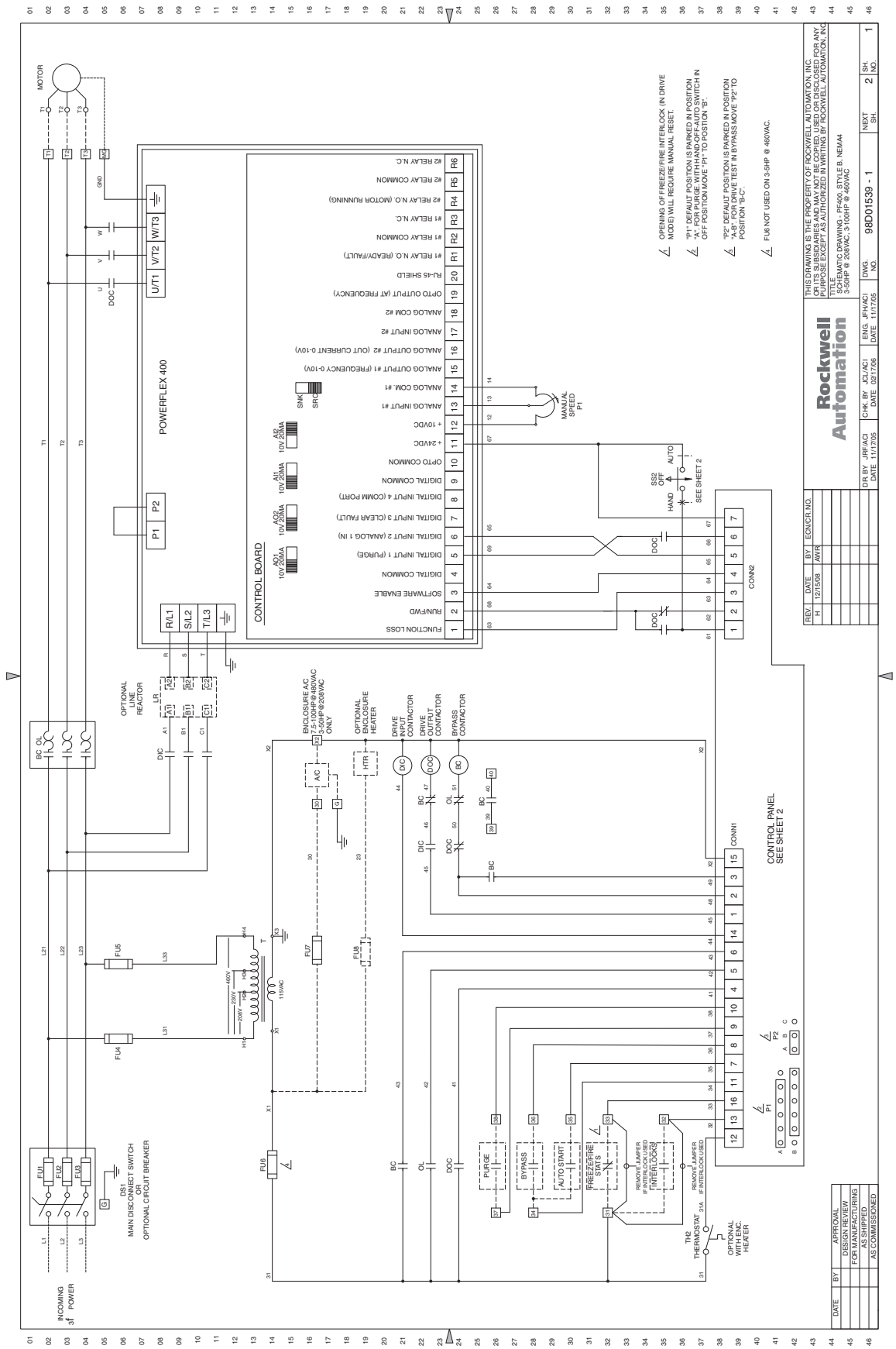


**Figure 2.13 3.0...30 Hp, 208V AC & 3.0...40 Hp, 460V AC Drives (Sheet 1 of 2) - NEMA/UL Type 4**


MOTOR
POWERFLEX 400
CONTROL BOARD
FUNCTION LOSS
RUN/FWD
SOFTWARE ENABLE
DIGITAL COMMON
DIGITAL INPUT 1 (PURGE)
DIGITAL INPUT 2 (ANALOG 1 IN)
DIGITAL INPUT 3 (CLEAR FAULT)
DIGITAL INPUT 4 (COMM PORT)
DIGITAL COMMON
OPTO COMMON
+ 24VDC
+ 10VDC
ANALOG INPUT #1
ANALOG COM. #1
ANALOG OUTPUT #1 (FREQUENCY 0-10V)
ANALOG OUTPUT #2 (OUT CURRENT 0-10V)
ANALOG INPUT #2
ANALOG COM #2
OPTO OUTPUT (AT FREQUENCY)
RJ-45 SHIELD
#1 RELAY N.O. (READY/FAULT)
#1 RELAY COMMON
#1 RELAY N.C.
#2 RELAY N.O. (MOTOR RUNNING)
#2 RELAY COMMON
#2 RELAY N.C.
CONN2
CONN1
CONTROL PANEL SEE SHEET 2
SEE SHEET 2
MANUAL SPEED P1
SS2 HAND OFF AUTO
OPENING OF FREEZE/FIRE INTERLOCK (IN DRIVE MODE) WILL REQUIRE MANUAL RESET.
"P1" DEFAULT POSITION IS PARKED IN POSITION "A". FOR PURGE WITH HAND-OFF-AUTO SWITCH IN OFF POSITION MOVE "P1" TO POSITION "B".
"P2" DEFAULT POSITION IS PARKED IN POSITION "A-B". FOR DRIVE TEST IN BYPASS MOVE "P2" TO POSITION "B-C".
FU6 NOT USED ON 3-5HP @ 460VAC.
OPTIONAL LINE REACTOR
ENCLOSURE A/C 7.5-100HP@480VAC 3-30HP@208VAC ONLY
OPTIONAL ENCLOSURE HEATER
DRIVE INPUT CONTACTOR
DRIVE OUTPUT CONTACTOR
BYPASS CONTACTOR
MAIN DISCONNECT SWITCH OR OPTIONAL CIRCUIT BREAKER
INCOMING 3ϕ POWER
PURGE
BYPASS
AUTO START
FREEZE/FIRE STATS
REMOVE JUMPER IF INTERLOCK USED
TH2 THERMOSTAT
OPTIONAL WITH ENC. HEATER
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TITLE SCHEMATIC DRAWING - PF400, STYLE B, NEMA4 3-50HP @ 208VAC, 3-100HP @ 480VAC
DWG. NO. 98D01539 - 1
NEXT SH. 2
SH. NO. 1
DR BY JRF/ACI DATE 11/17/05
CHK BY JCL/ACI DATE 02/17/06
ENG. JFH/ACI DATE 11/17/05
Rockwell Automation
REV. H
DATE 12/15/08
BY AMYR
ECN/CR NO.
APPROVAL
DESIGN REVIEW
FOR MANUFACTURING
AS SHIPPED
AS COMMISSIONED

**Figure 2.14 3.0…30 Hp, 208V AC & 3.0…40 Hp, 460V AC Drives (Sheet 2 of 2) - NEMA/UL Type 4**

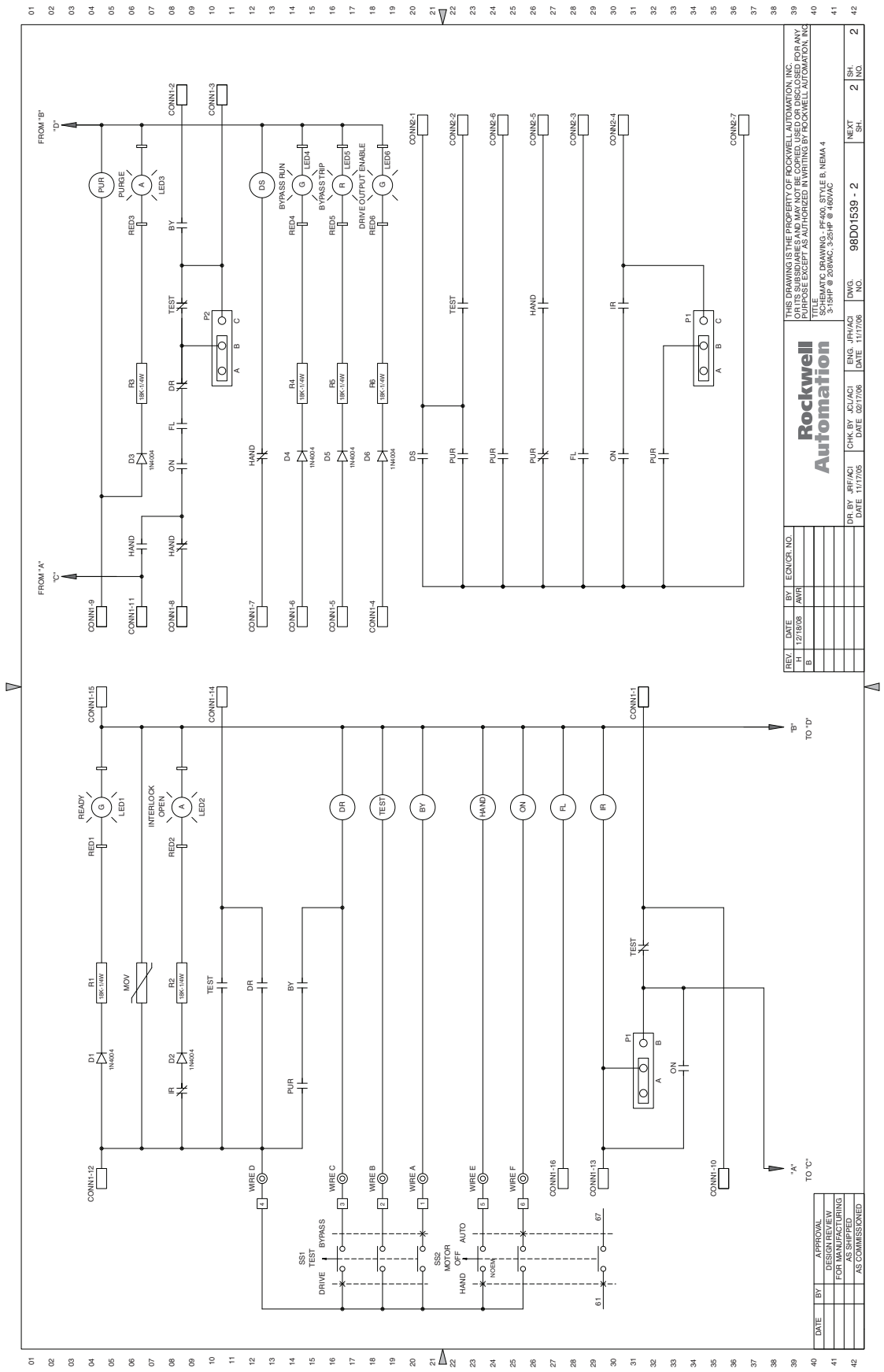
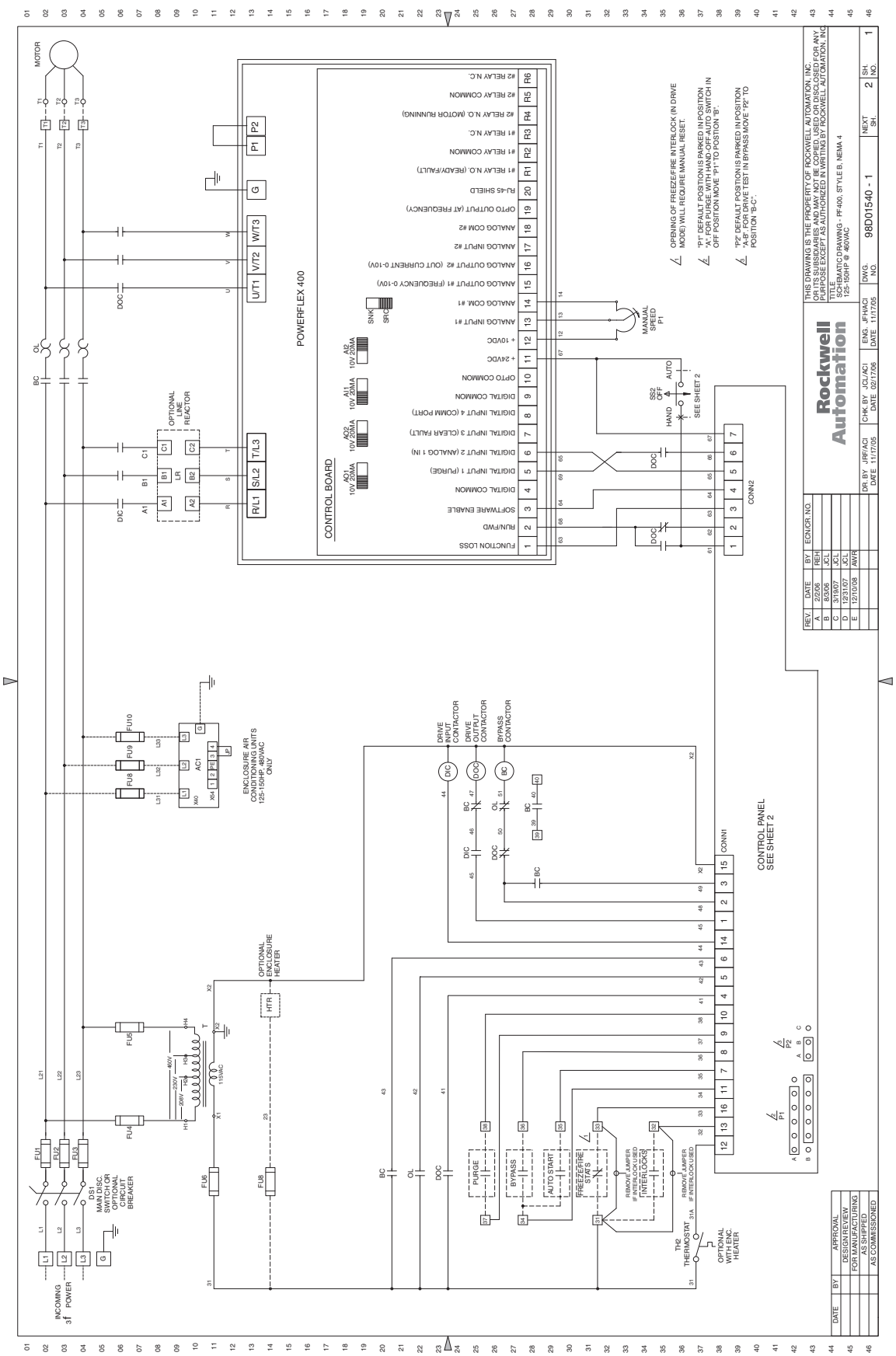


**Figure 2.15 125…150 Hp, 460V AC Drives (Sheet 1 of 2) - NEMA/UL Type 4**


MOTOR
POWERFLEX 400
CONTROL BOARD
OPTIONAL LINE REACTOR
ENCLOSURE AIR CONDITIONING UNITS 125-150HP, 460VAC ONLY
OPTIONAL ENCLOSURE HEATER
DRIVE INPUT CONTACTOR
DRIVE OUTPUT CONTACTOR
BYPASS CONTACTOR
CONTROL PANEL SEE SHEET 2
INCOMING 3ϕ POWER
DS1 MAIN DISC. SWITCH/COR OPTIONAL CIRCUIT BREAKER
PURGE
BYPASS
AUTO START
FREEZE/FIRE STATS
REMOVE JUMPER IF INTERLOCK USED
TH2 THERMOSTAT
OPTIONAL WITH HEAT
Rockwell Automation
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98D01540 - 1

**Figure 2.16 125…150 Hp, 460V AC Drives (Sheet 2 of 2) - NEMA/UL Type 4**

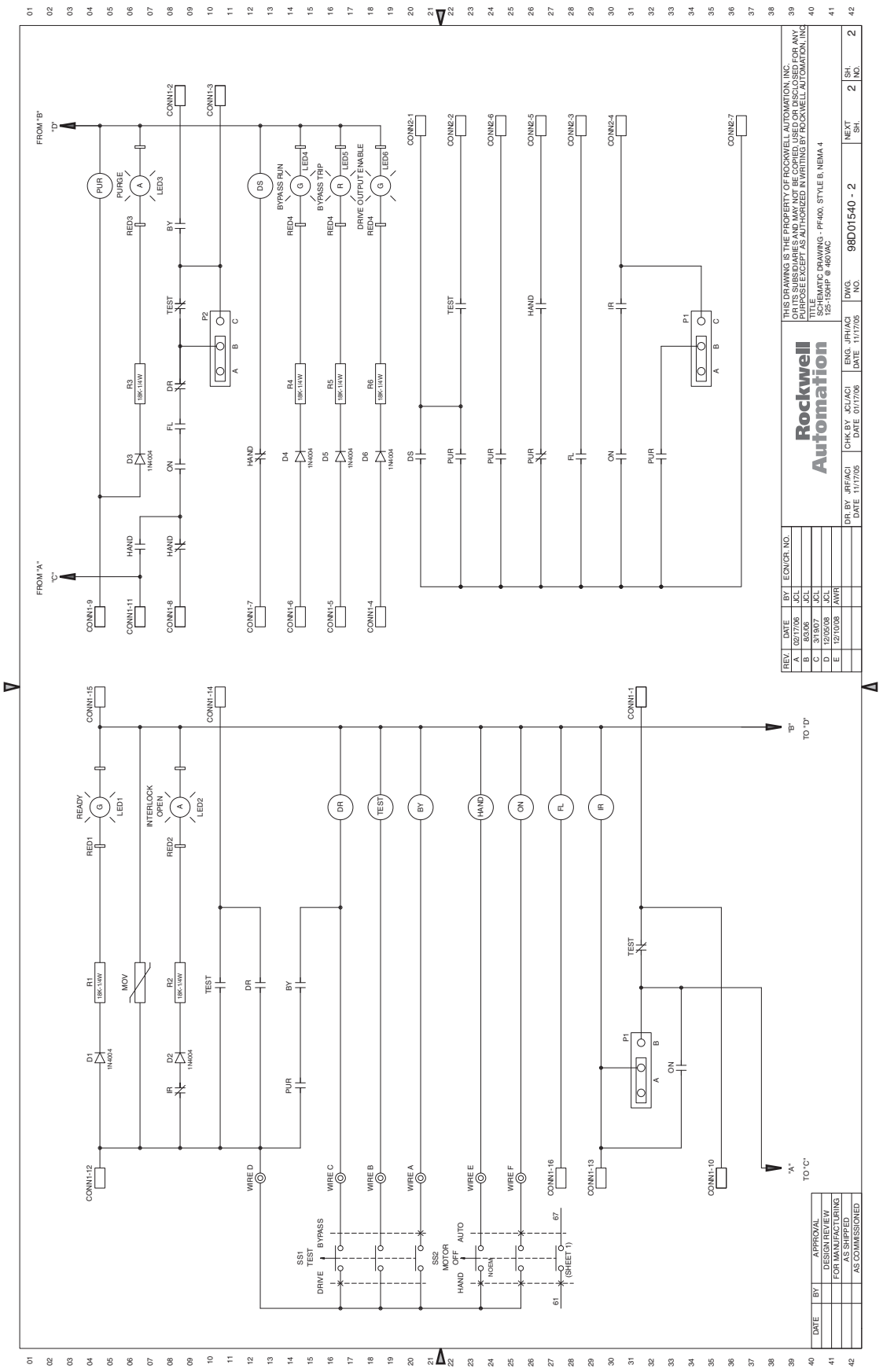
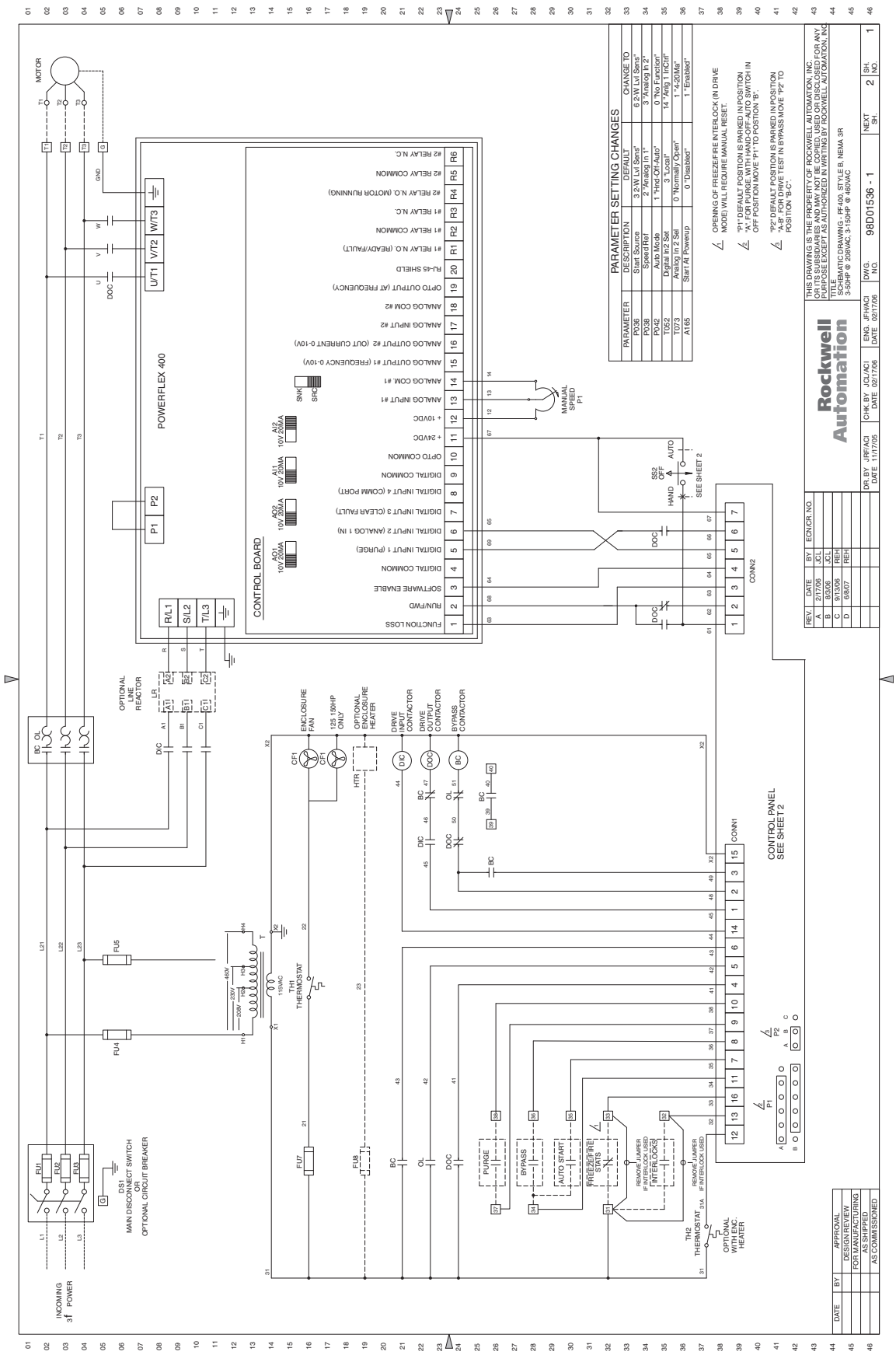


**Figure 2.17 3.0...50 Hp, 208V AC & 3.0...150 Hp, 460V AC Drives (Sheet 1 of 2) - NEMA/UL Type 3R**


PARAMETER SETTING CHANGES
PARAMETER | DESCRIPTION | DEFAULT | CHANGE TO
P036 | Start Source | 3 "2-W Lvl Sens" | 6 "2-W Lvl Sens"
P038 | Speed Ref | 2 "Analog In 1" | 3 "Analog In 2"
P042 | Auto Mode | 1 "Hnd-Off-Auto" | 0 "No Function"
T052 | Digital In2 Sel | 14 "Anlg 1 InChf" | 3 "Local"
T073 | Analog In 2 Sel | 0 "Normally Open" | 1 "4-20Ma"
A165 | Start At Powerup | 0 "Disabled" | 1 "Enabled"
POWERFLEX 400
CONTROL BOARD
CONN1
CONN2
CONTROL PANEL SEE SHEET 2
SEE SHEET 2
MOTOR
MAIN DISCONNECT SWITCH OR OPTIONAL CIRCUIT BREAKER
INCOMING 3Ø POWER
OPTIONAL LINE REACTOR
ENCLOSURE FAN
125 150HP ONLY
OPTIONAL ENCLOSURE HEATER
DRIVE INPUT CONTACTOR
DRIVE OUTPUT CONTACTOR
BYPASS CONTACTOR
THERMOSTAT
OPTIONAL WITH ENC. HEATER
PURGE
BYPASS
AUTO START
FREEZE/FIRE STAT
REMOVE JUMPER IF INTERLOCK USED
OPENING OF FREEZE/FIRE INTERLOCK (IN DRIVE MODE) WILL REQUIRE MANUAL RESET.
"P1" DEFAULT POSITION IS PARKED IN POSITION "A". FOR PURGE WITH HAND-OFF-AUTO SWITCH IN OFF POSITION MOVE "P1" TO POSITION "B".
"P2" DEFAULT POSITION IS PARKED IN POSITION "A". FOR DIRECT TEST IN BYPASS MOVE "P2" TO POSITION "B-C".
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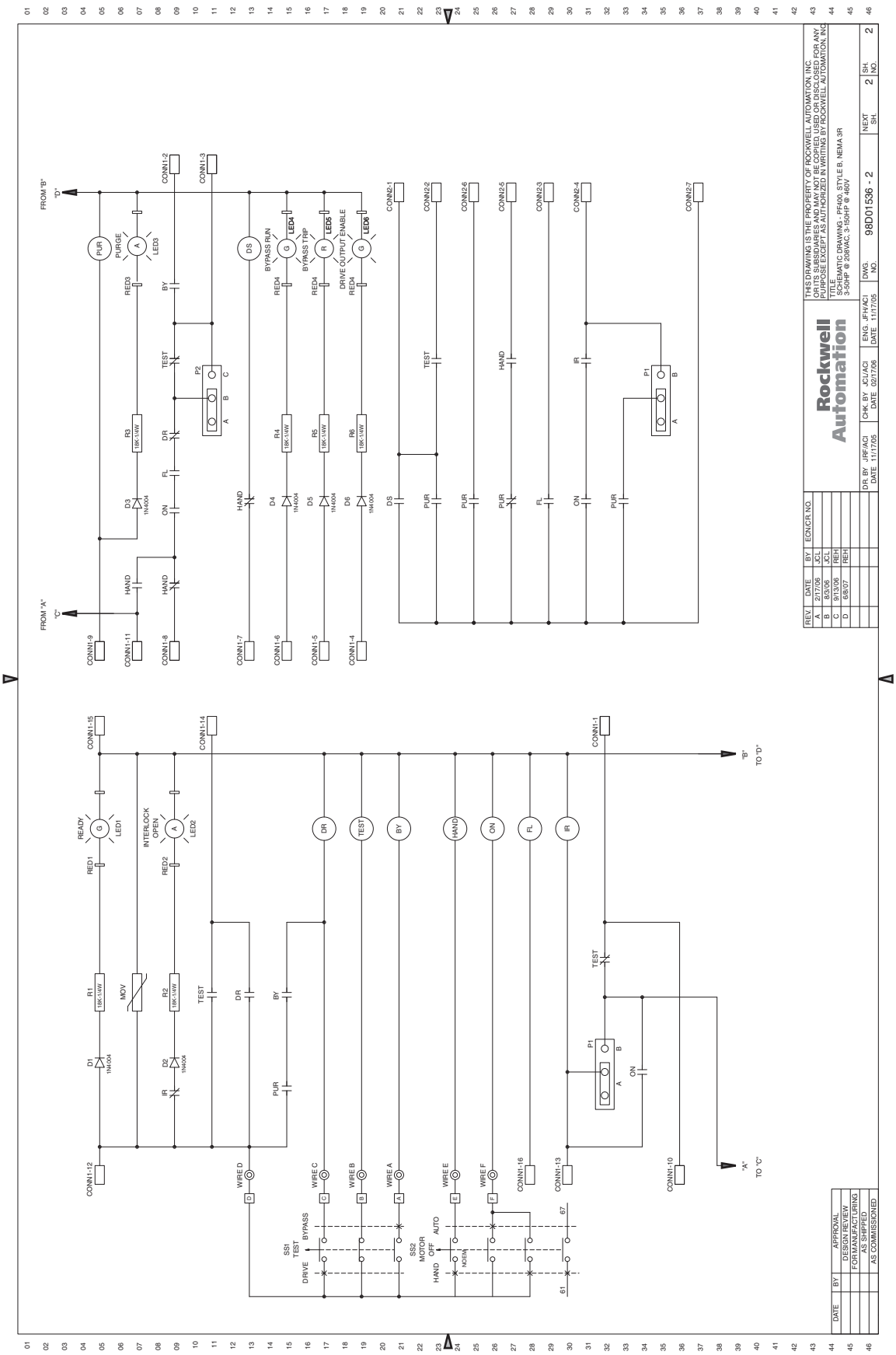
TITLE
SCHEMATIC DRAWING - PF400, STYLE B, NEMA 3R
3-50HP @ 208VAC, 3-150HP @ 460VAC
DWG. NO. 98D01536 - 1
NEXT SH. 2
SH. NO. 1
DR. BY JRF/ACI DATE 11/17/05
CHK. BY JCL/ACI DATE 02/17/06
ENG. JFHACI DATE 02/17/06
Rockwell Automation
REV. | DATE | BY | ECN/COR. NO.
A | 2/17/06 | JCL
B | 8/3/06 | JCL
C | 9/13/06 | REH
D | 6/4/07 | REH
DATE | BY | APPROVAL
DESIGN REVIEW
FOR MANUFACTURING
AS SHIPPED
AS COMMISSIONED

**Figure 2.18 3.0…50 Hp, 208V AC & 3.0…150 Hp, 460V AC Drives (Sheet 2 of 2) - NEMA/UL Type 3R**


FROM "B" "D"
FROM "A" "C"
PURGE
INTERLOCK OPEN
READY
BYPASS RUN
BYPASS TRIP
DRIVE OUTPUT ENABLE
MOV
SS1 TEST BYPASS DRIVE
SS2 MOTOR OFF HAND AUTO
TO "B" "D"
TO "A" "C"
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Rockwell Automation
DWG. NO. 98D01536 - 2
NEXT SH. 2
SH. NO. 2

## Interconnect Drawings

**Figure 2.19 3.0...50 Hp, 208V AC & 3.0...150 Hp, 460V AC Drives - NEMA/UL Type 1**

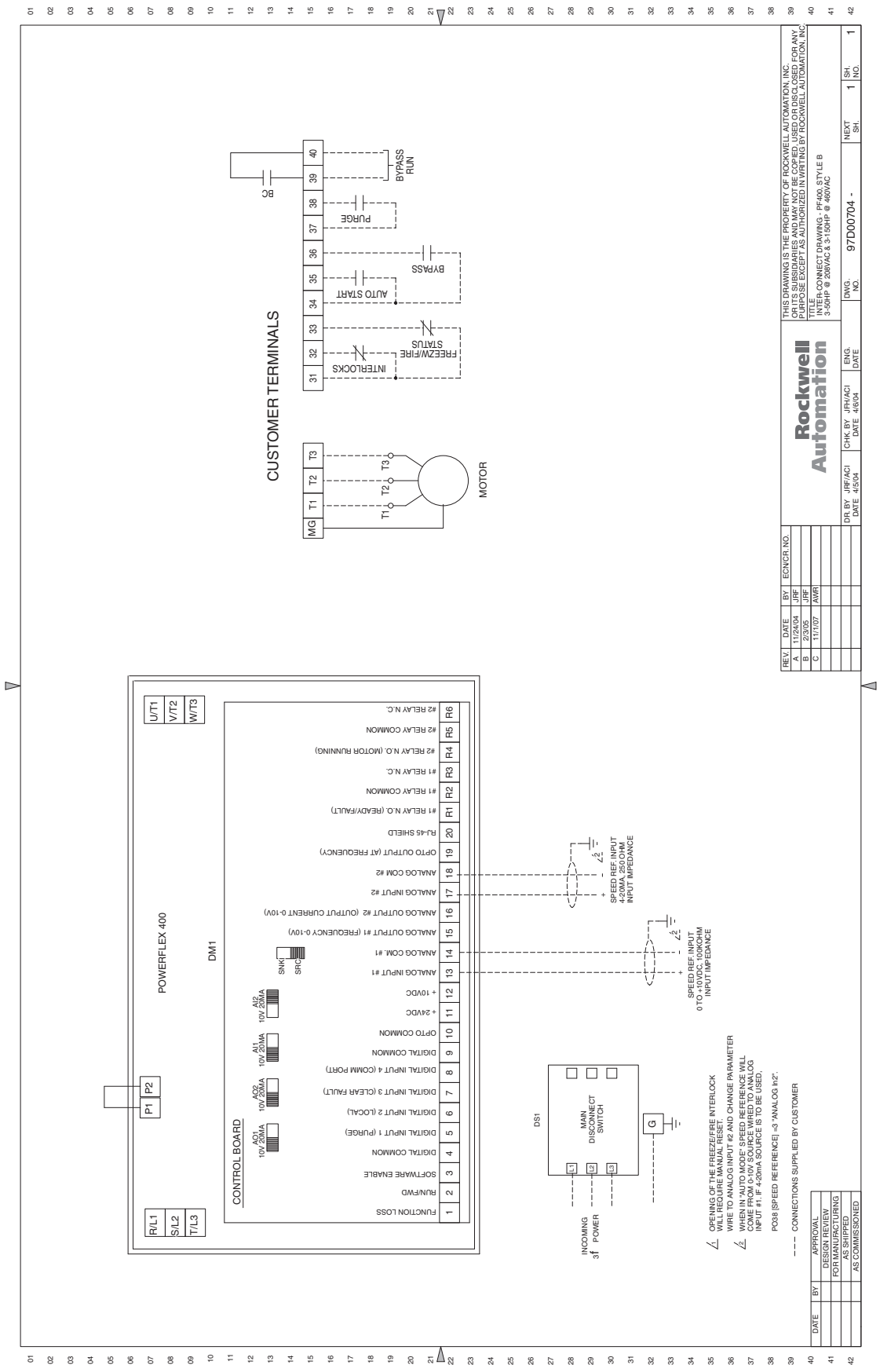


**Figure 2.20 200 Hp, 460V AC Drives - NEMA/UL Type 1**

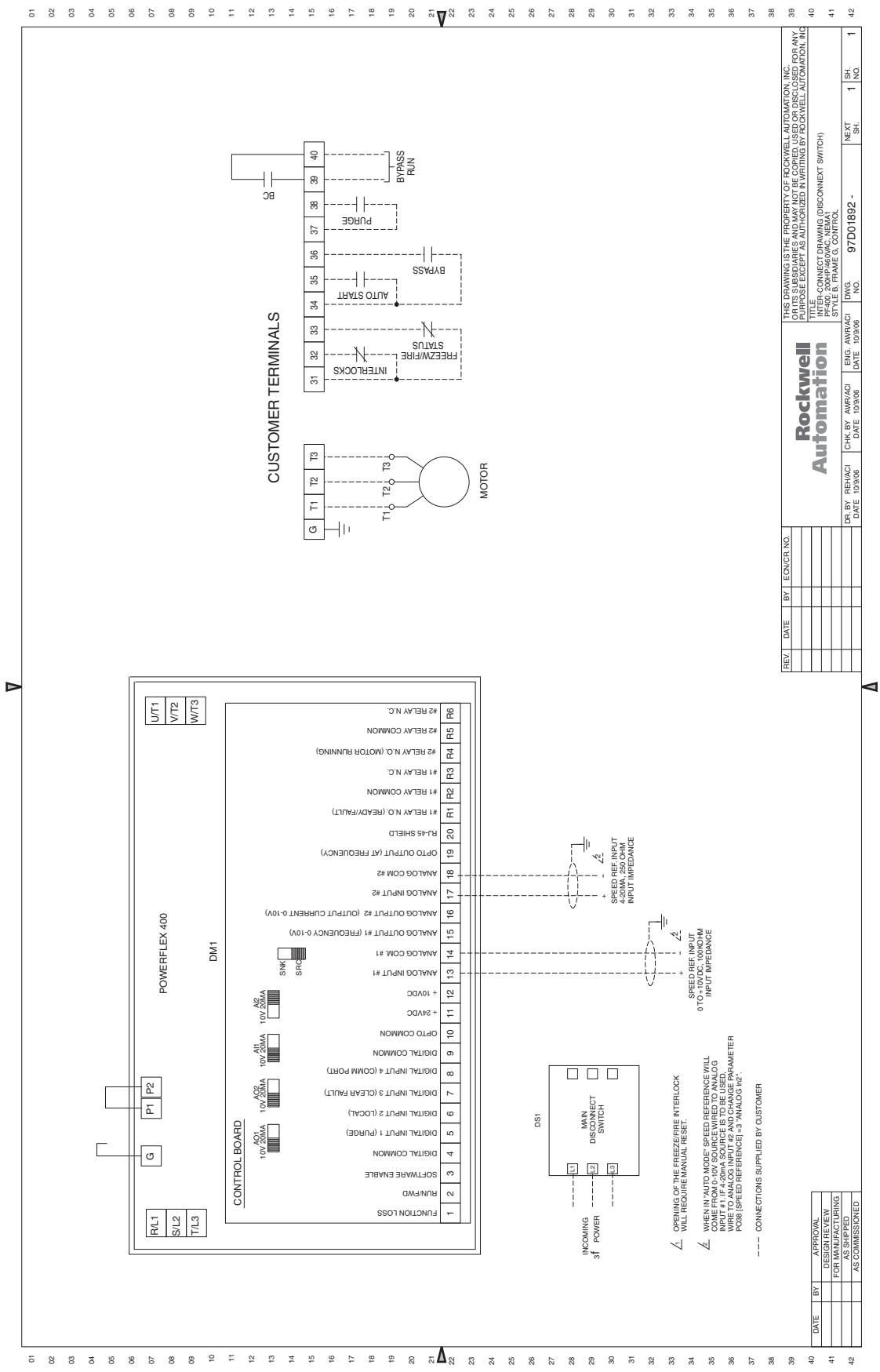


**Figure 2.21 250…350 Hp, 460V AC Drives - NEMA/UL Type 1**

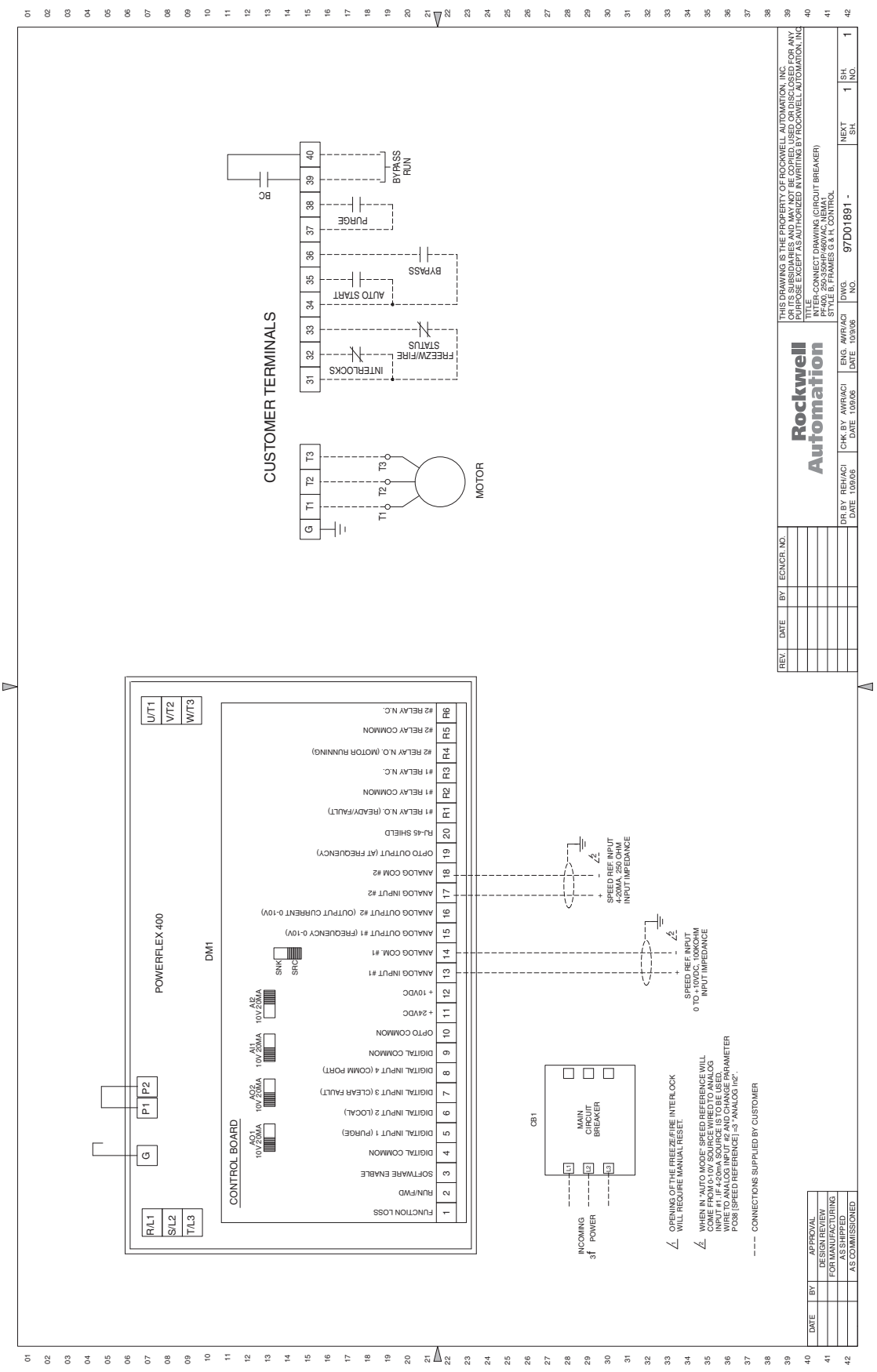


**Figure 2.22 3.0…50 Hp, 208V AC & 3.0…100 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1**

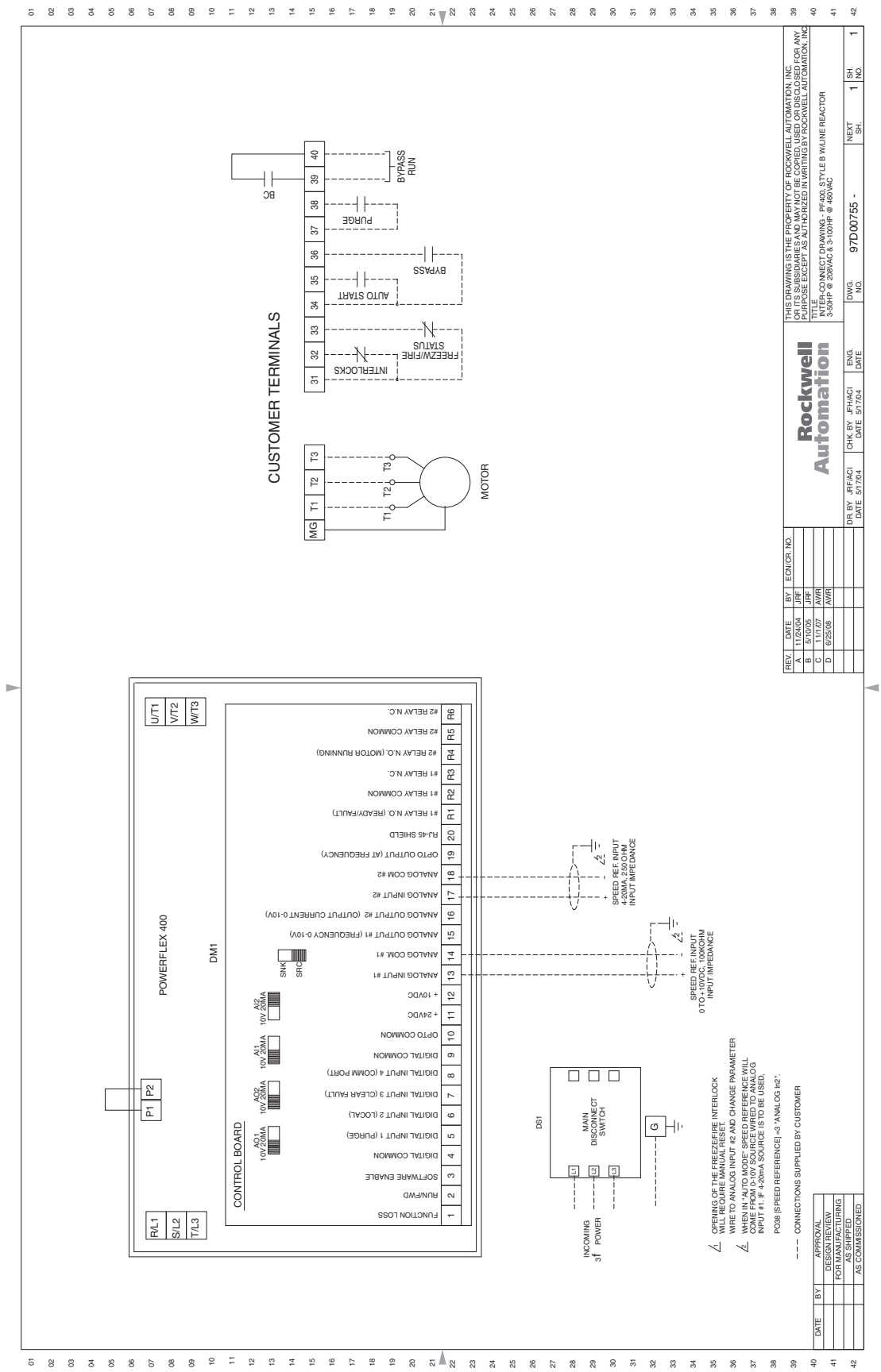


**Figure 2.23 3.0…50 Hp, 208V & 3.0…150 Hp, 460V AC Drives - NEMA/UL Type 12, 4, 3R**

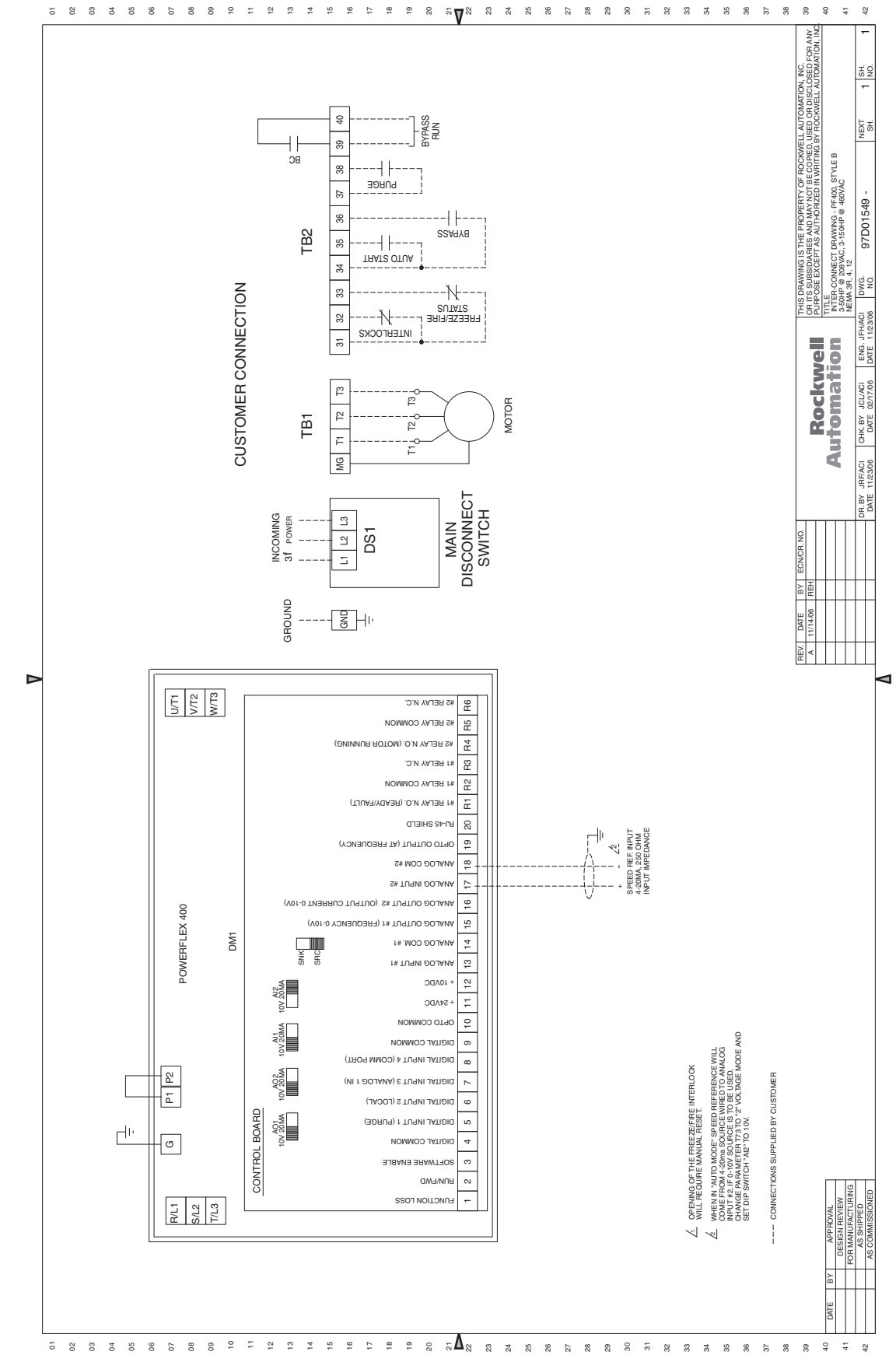
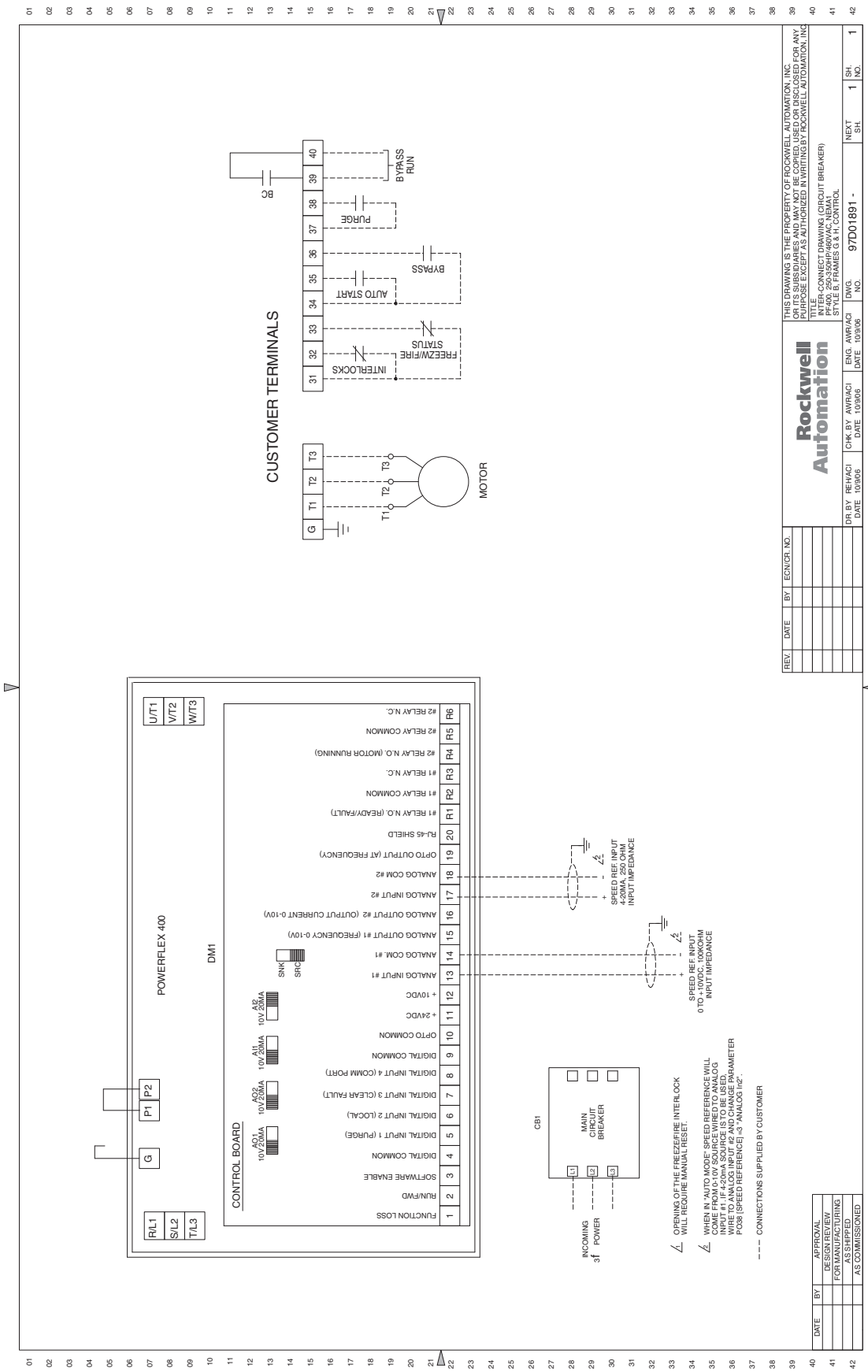


**Figure 2.24 250…350 Hp, 460V AC Drives - NEMA/UL Type 1**


CUSTOMER TERMINALS
MOTOR
BC
BYPASS RUN
PURGE
BYPASS
AUTO START
INTERLOCKS
FREEZ/FIRE STATUS
POWERFLEX 400
DM1
CONTROL BOARD
R/L1
S/L2
T/L3
U/T1
V/T2
W/T3
P1
P2
G
CB1
MAIN CIRCUIT BREAKER
INCOMING 3Ø POWER
SPEED REF INPUT 4-20MA, 250 OHM INPUT IMPEDANCE
SPEED REF INPUT 0 TO +10VDC, 100KOHM INPUT IMPEDANCE
OPENING OF THE FREEZE/FIRE INTERLOCK WILL REQUIRE MANUAL RESET.
WHEN IN "AUTO MODE" SPEED REFERENCE WILL COME FROM A 4-20mA SOURCE WIRED TO ANALOG INPUT #1. IF A 2-20mA SOURCE IS TO BE USED, WIRE TO ANALOG INPUT #2 AND CHANGE PARAMETER P038 [SPEED REFERENCE] =3 "ANALOG In2".
--- CONNECTIONS SUPPLIED BY CUSTOMER
Rockwell Automation
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INTER-CONNECT DRAWING (CIRCUIT BREAKER)
PF400, 250-350HP,460VAC, NEMA1
STYLE B, FRAMES G & H, CONTROL
97D01891 -
APPROVAL
DESIGN REVIEW
FOR MANUFACTURING
AS SHIPPED
AS COMMISSIONED

## Layout Drawings

**Figure 2.25 3.0…5.0 Hp, 208V AC & 3.0…10 Hp, 460V AC Drives - NEMA/UL Type 1**

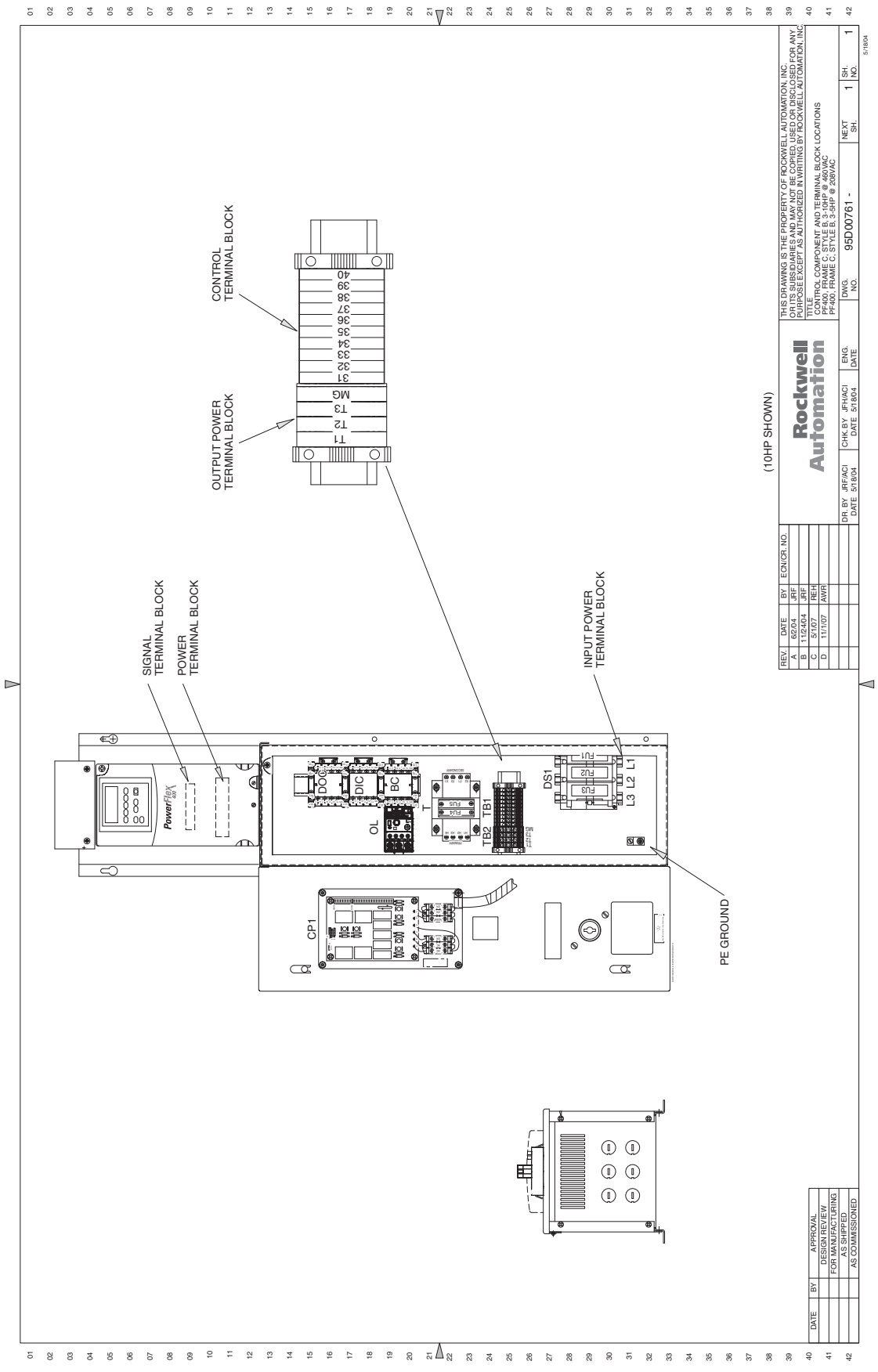


**Figure 2.26 7.5…10 Hp, 208V AC & 15…20 Hp, 460V AC Drives - NEMA/UL Type 1**

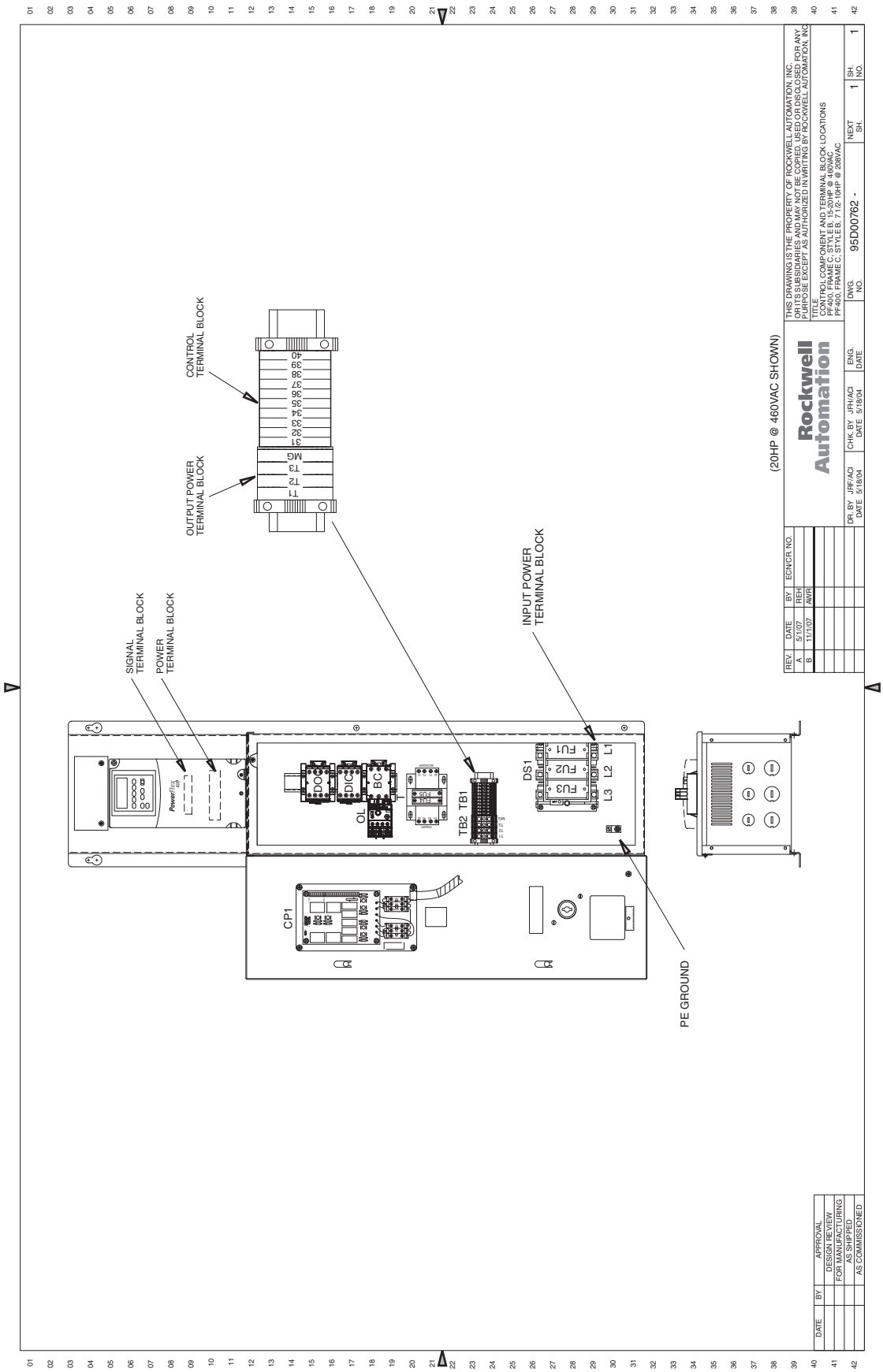


**Figure 2.27 15…20 Hp, 208V AC & 25…40 Hp, 460V AC Drives - NEMA/UL Type 1**

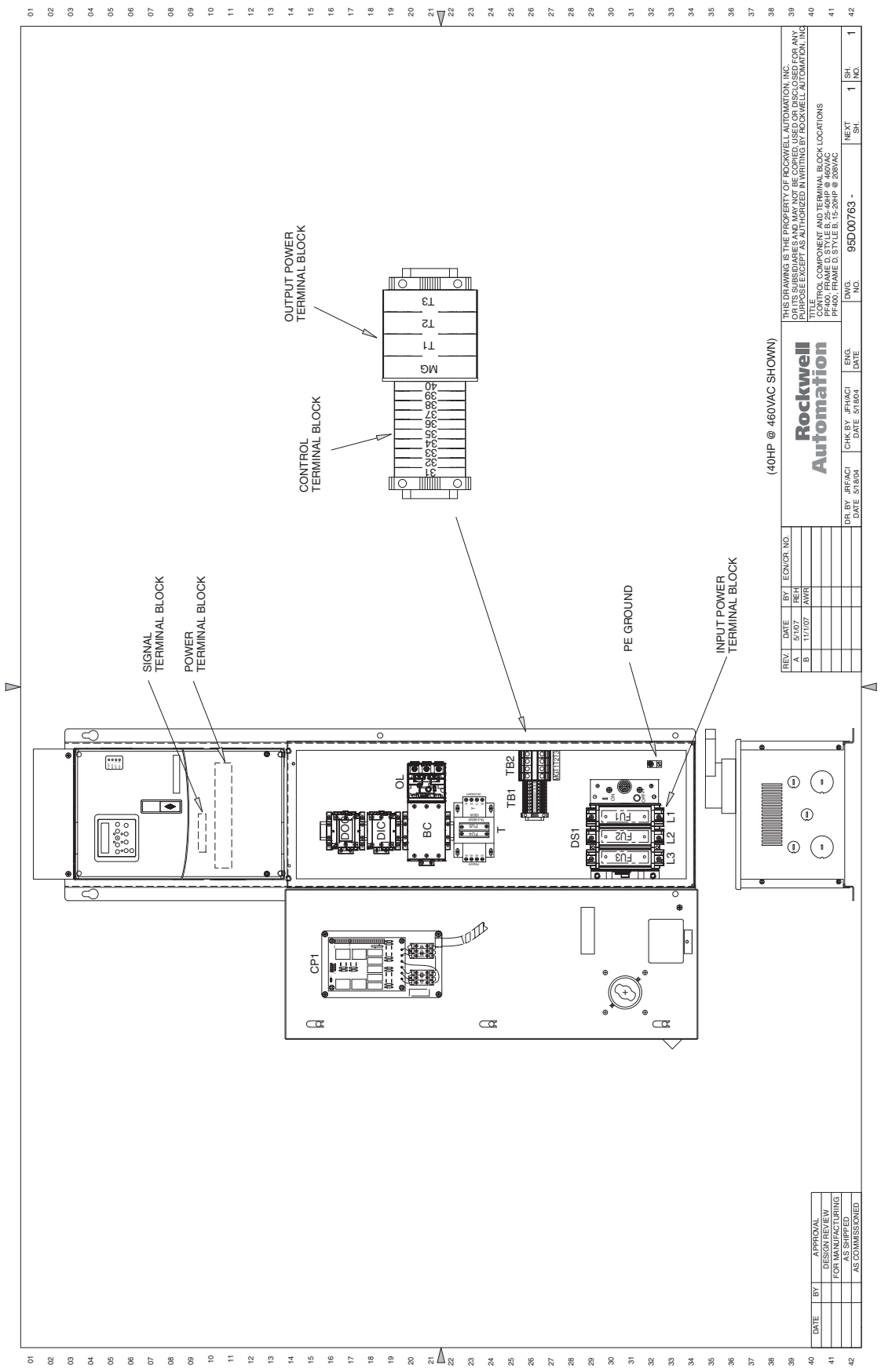


**Figure 2.28 25…30 Hp, 208V AC Drives - NEMA/UL Type 1**

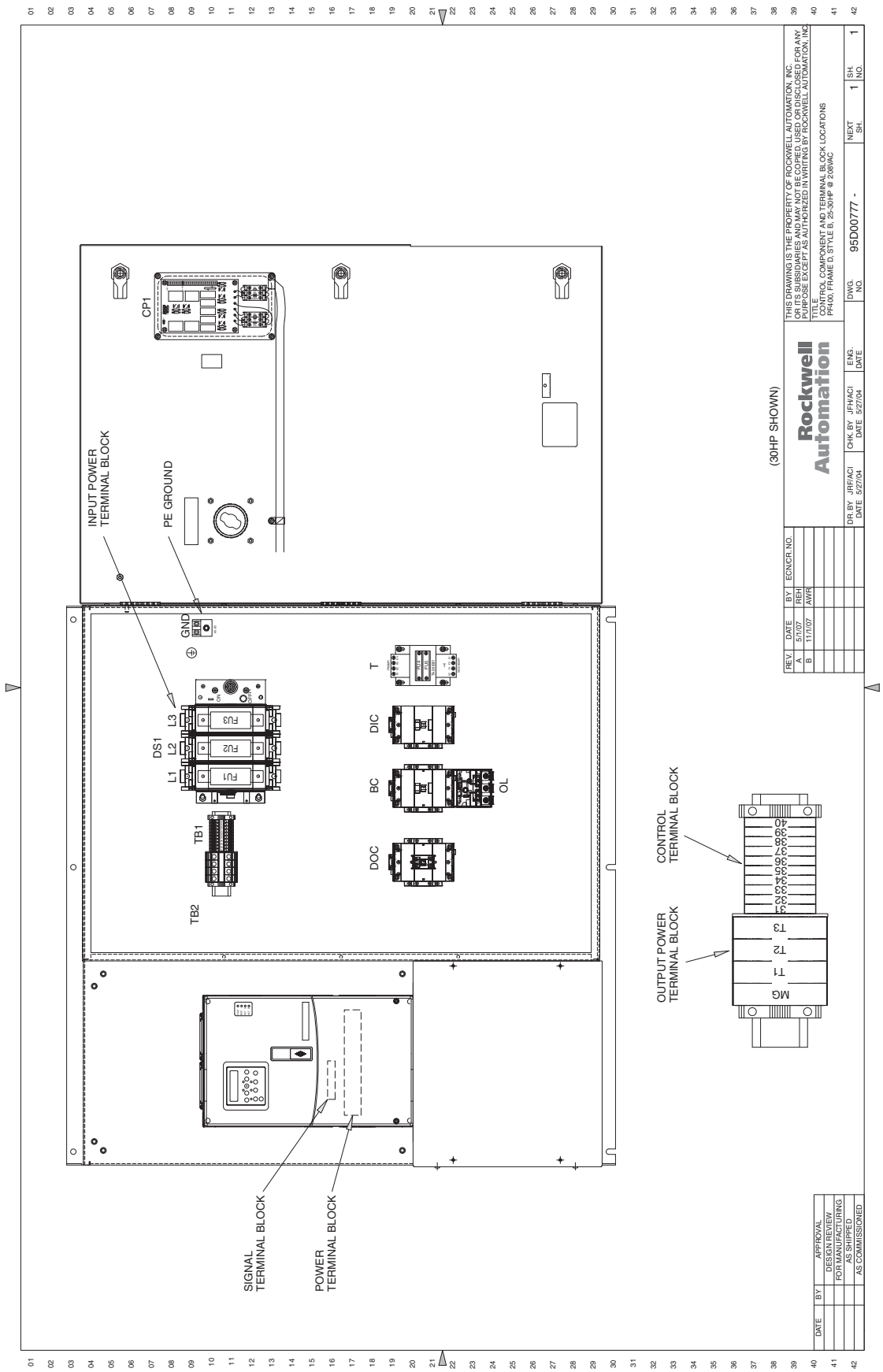


**Figure 2.29 50…75 Hp, 460V AC Drives - NEMA/UL Type 1**

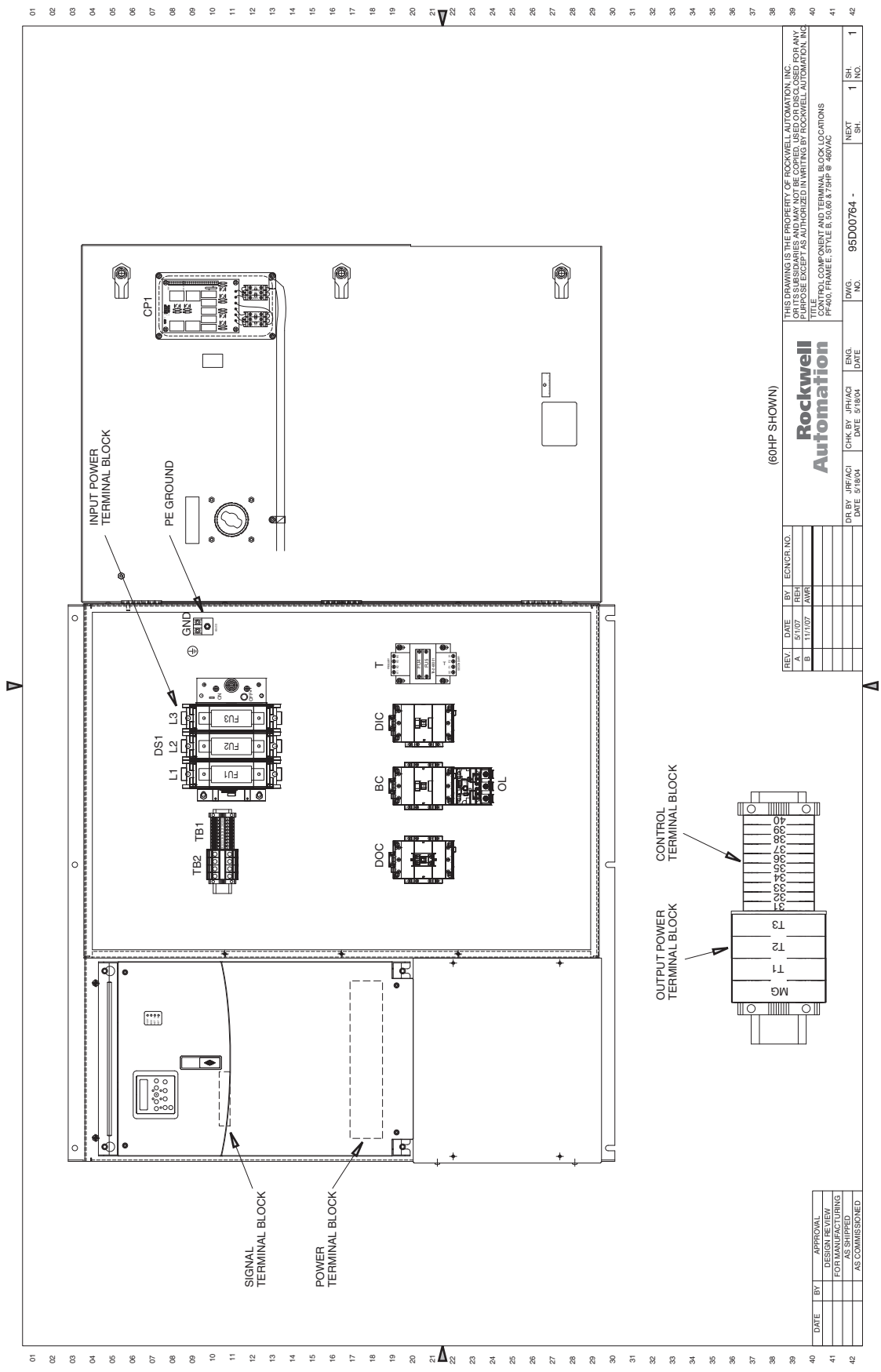


**Figure 2.30 40 Hp, 208V AC & 100 Hp, 460V AC Drives - NEMA/UL Type 1**

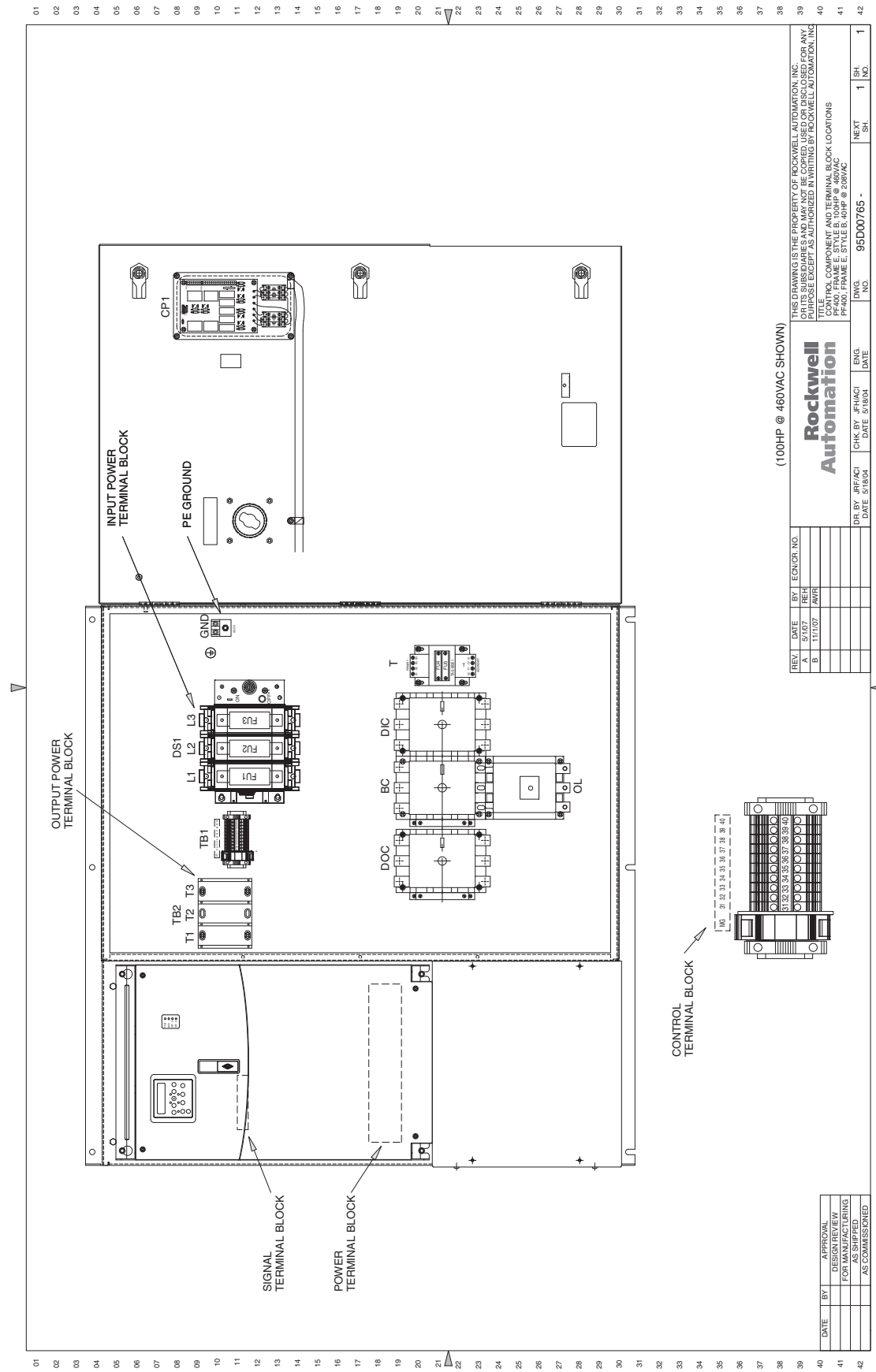


**Figure 2.31 50 Hp, 208V AC Drives - NEMA/UL Type 1**

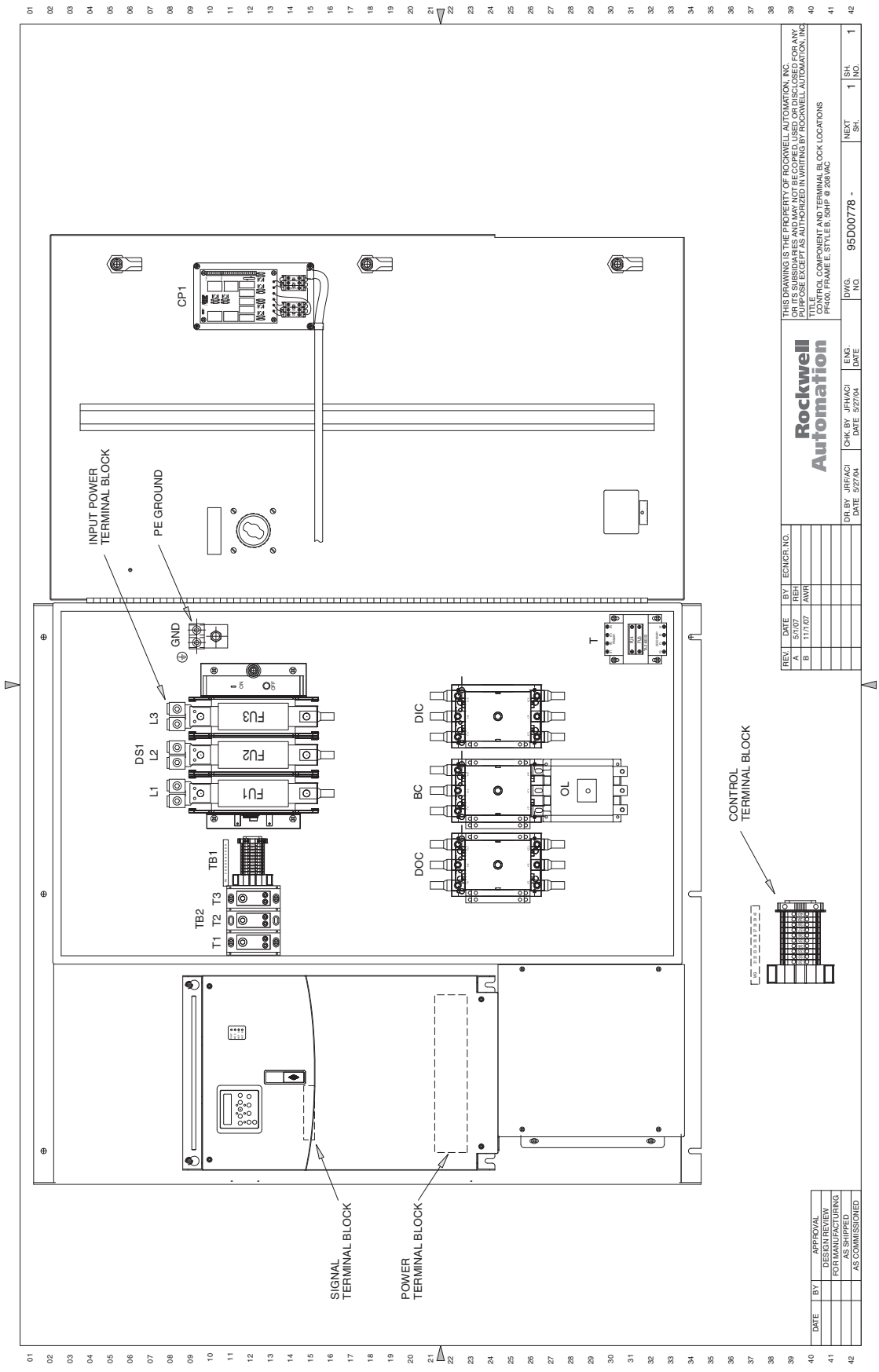


**Figure 2.32 125…150 Hp, 460V AC Drives - NEMA/UL Type 1**

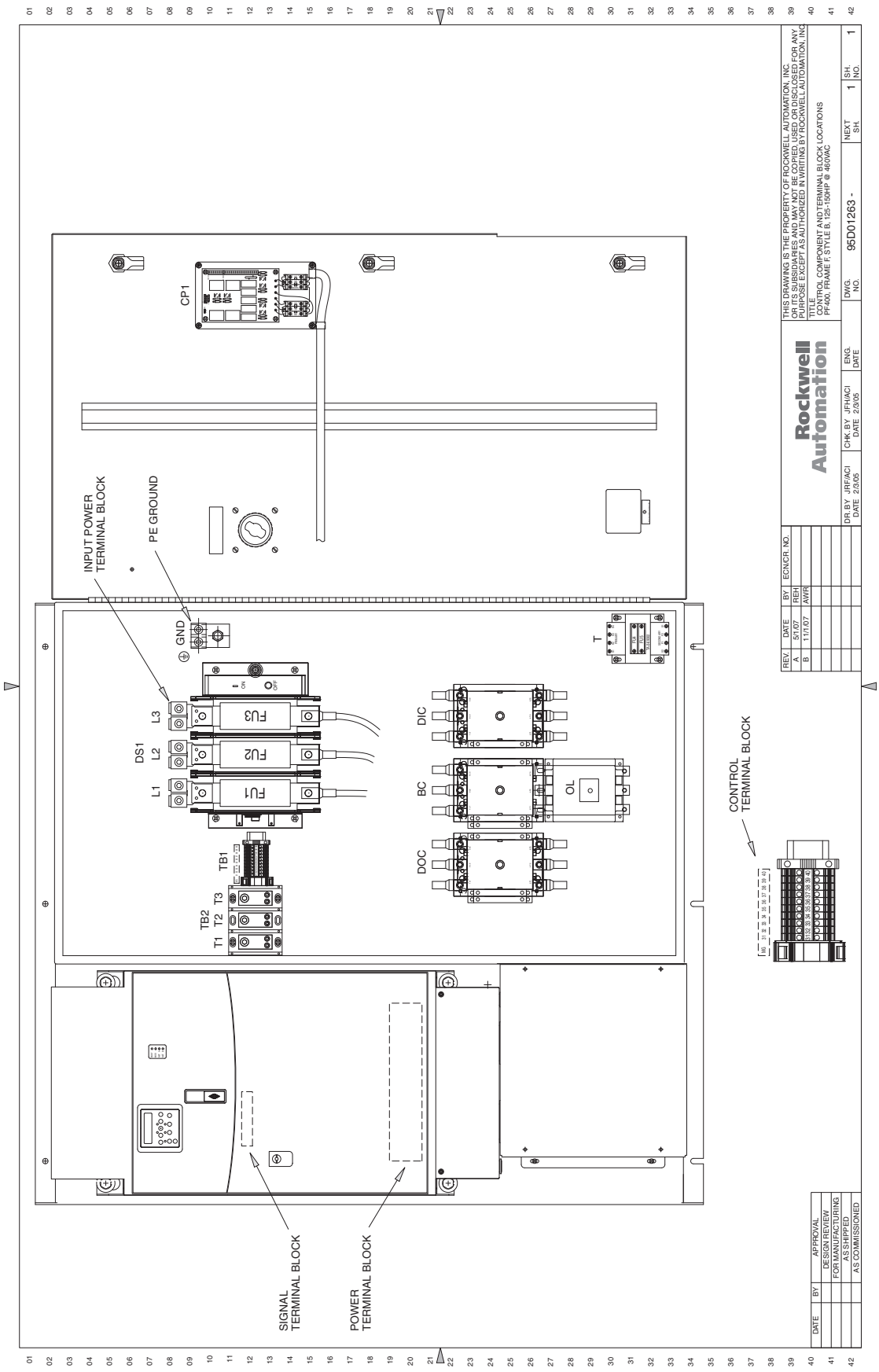


**Figure 2.33 200…250 Hp, 460V AC Drives - NEMA/UL Type 1**

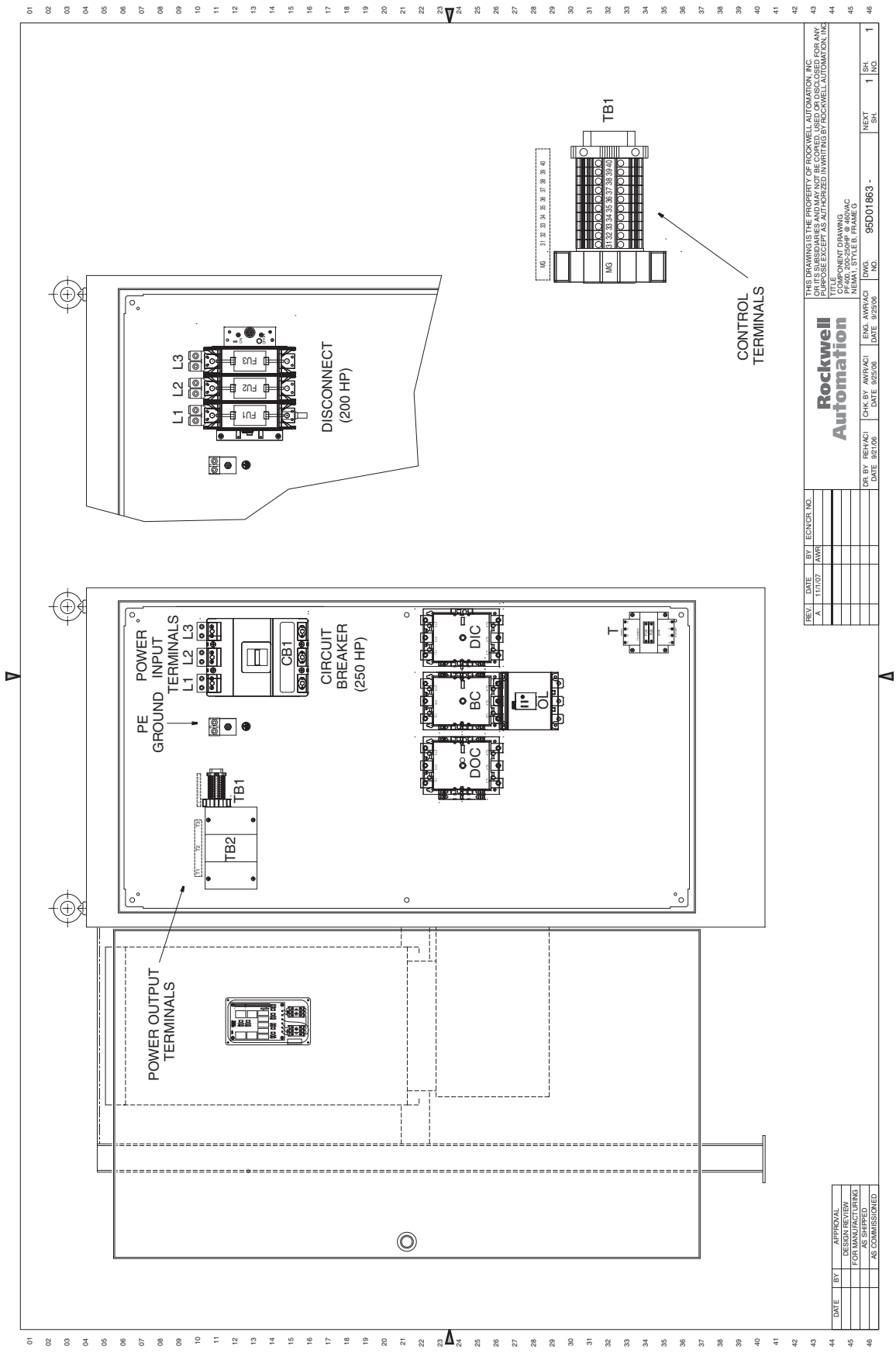


**Figure 2.34 300…350 Hp, 460V AC Drives - NEMA/UL Type 1**

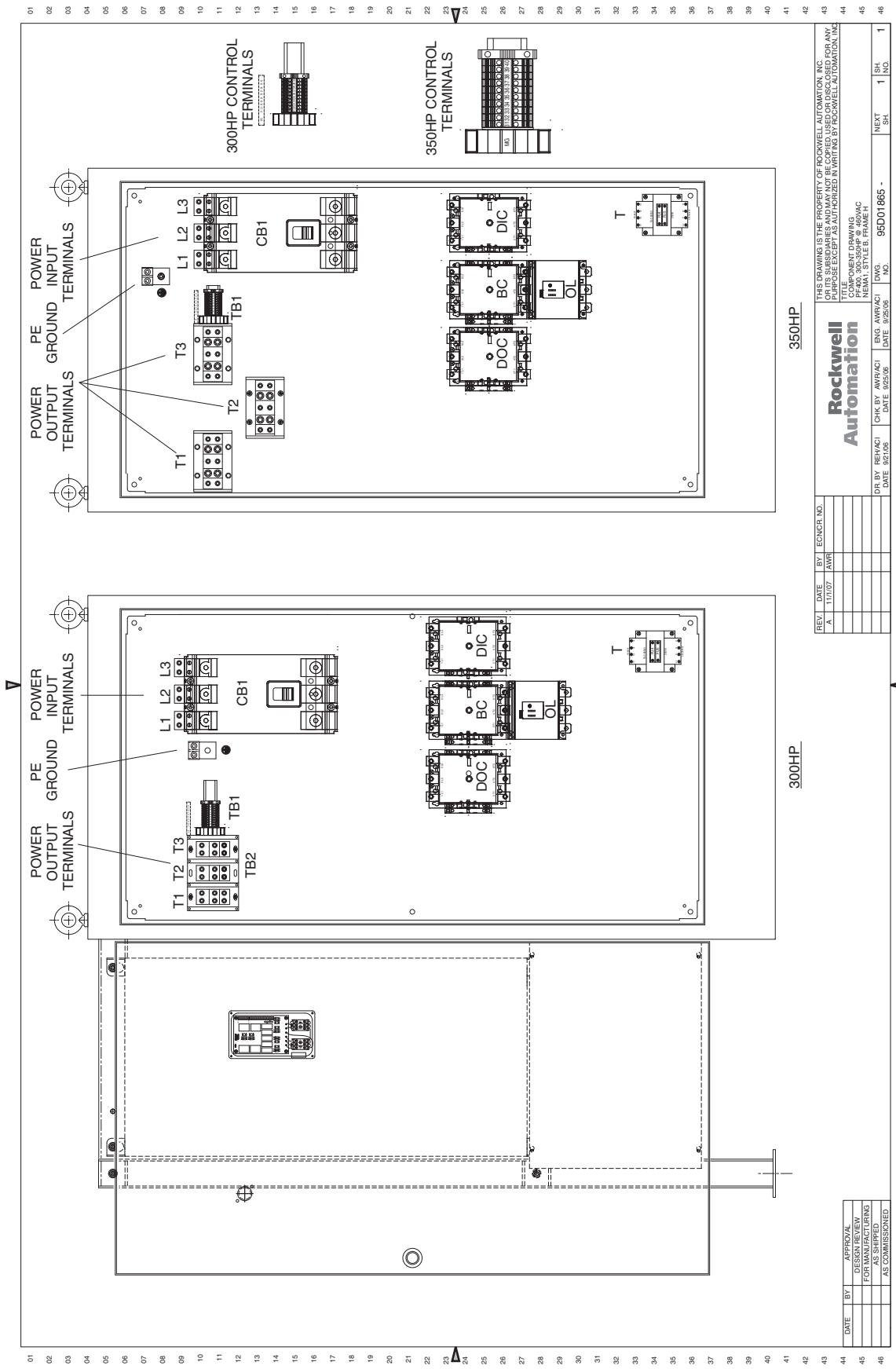


**Figure 2.35 3.0…5.0 Hp, 208V AC & 3.0…10 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1**

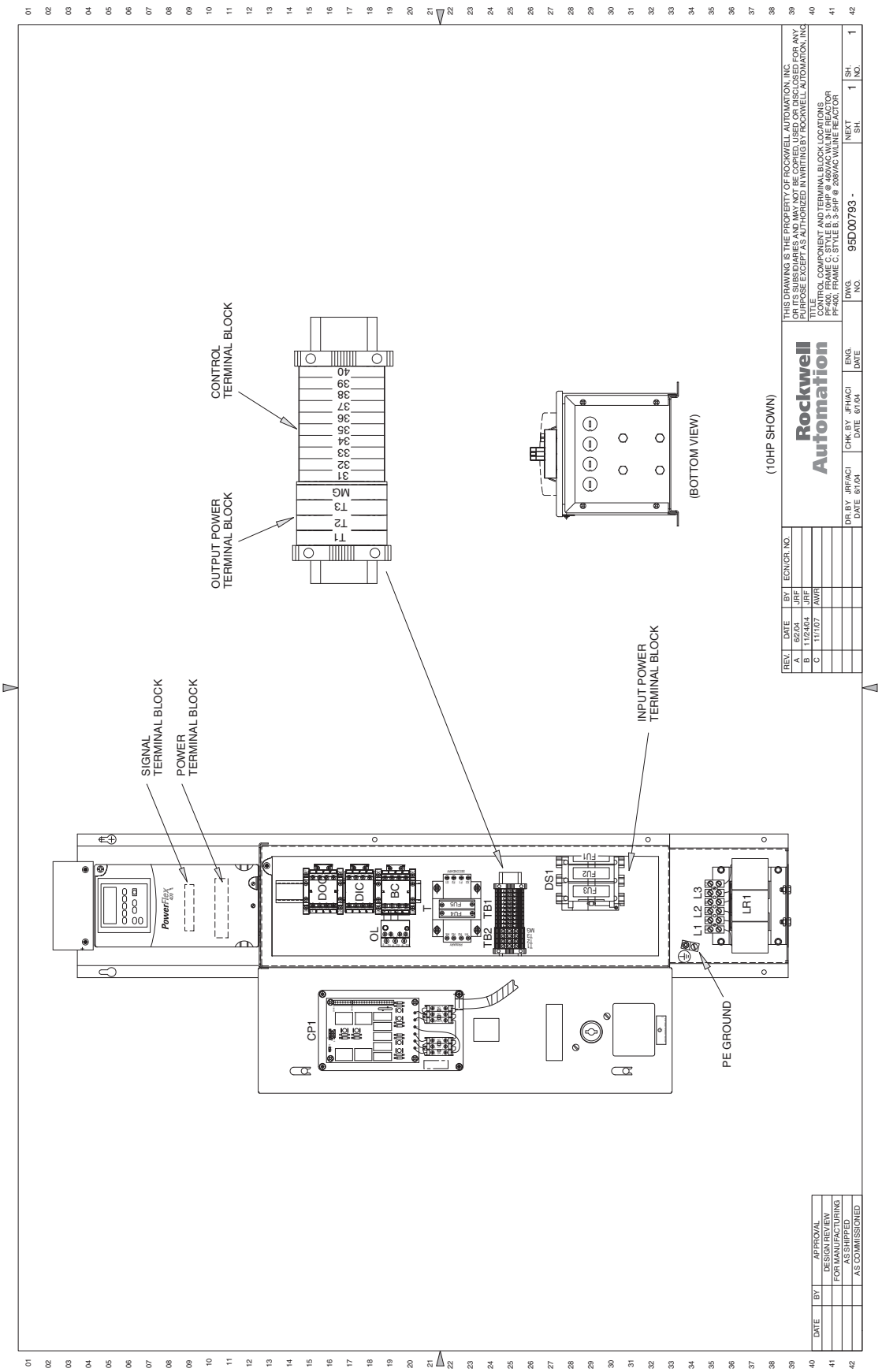


**Figure 2.36 7.5…10 Hp, 208V AC & 15…20 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1**

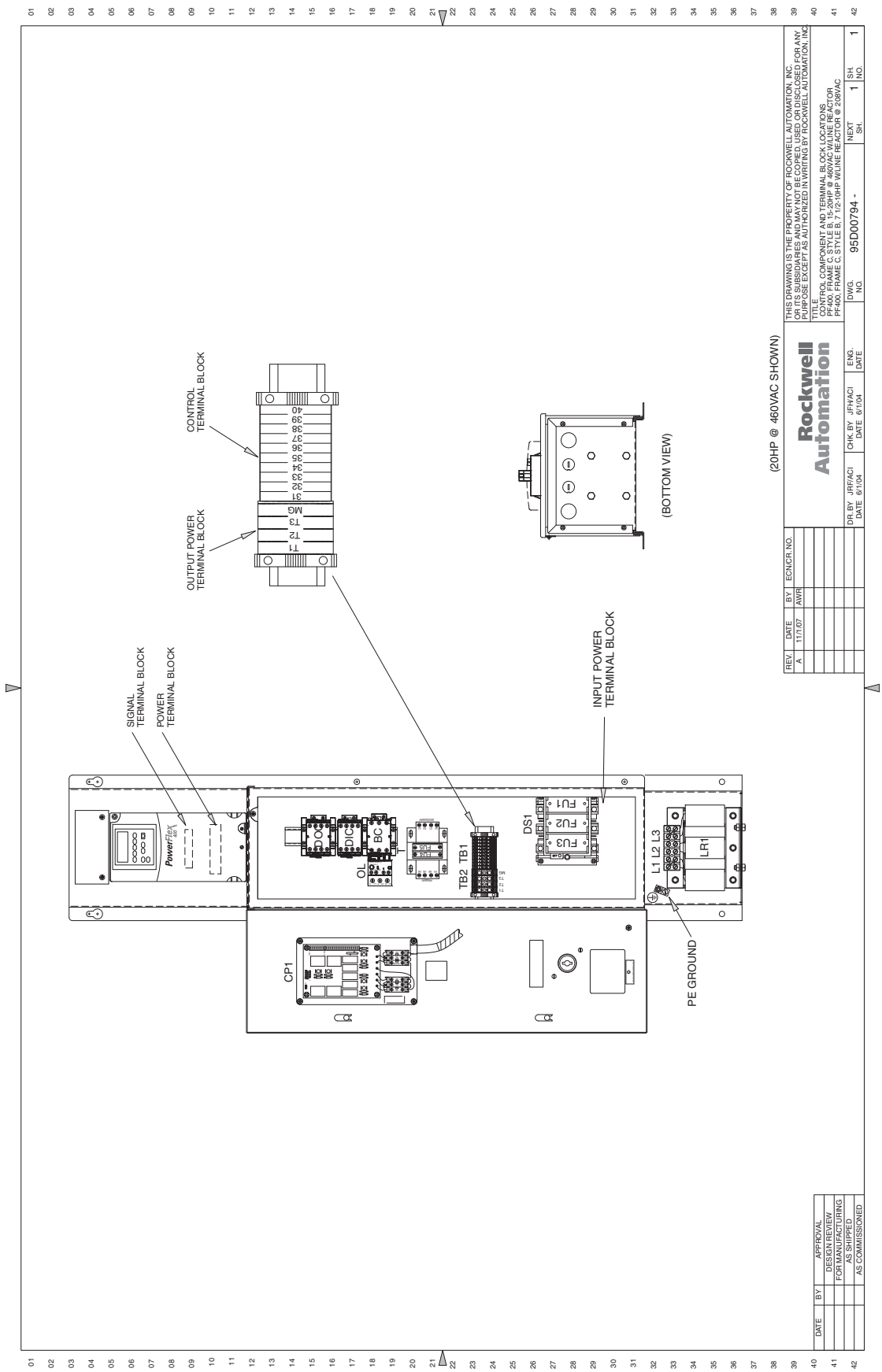


**Figure 2.37 15…20 Hp, 208V AC & 25…40 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1**

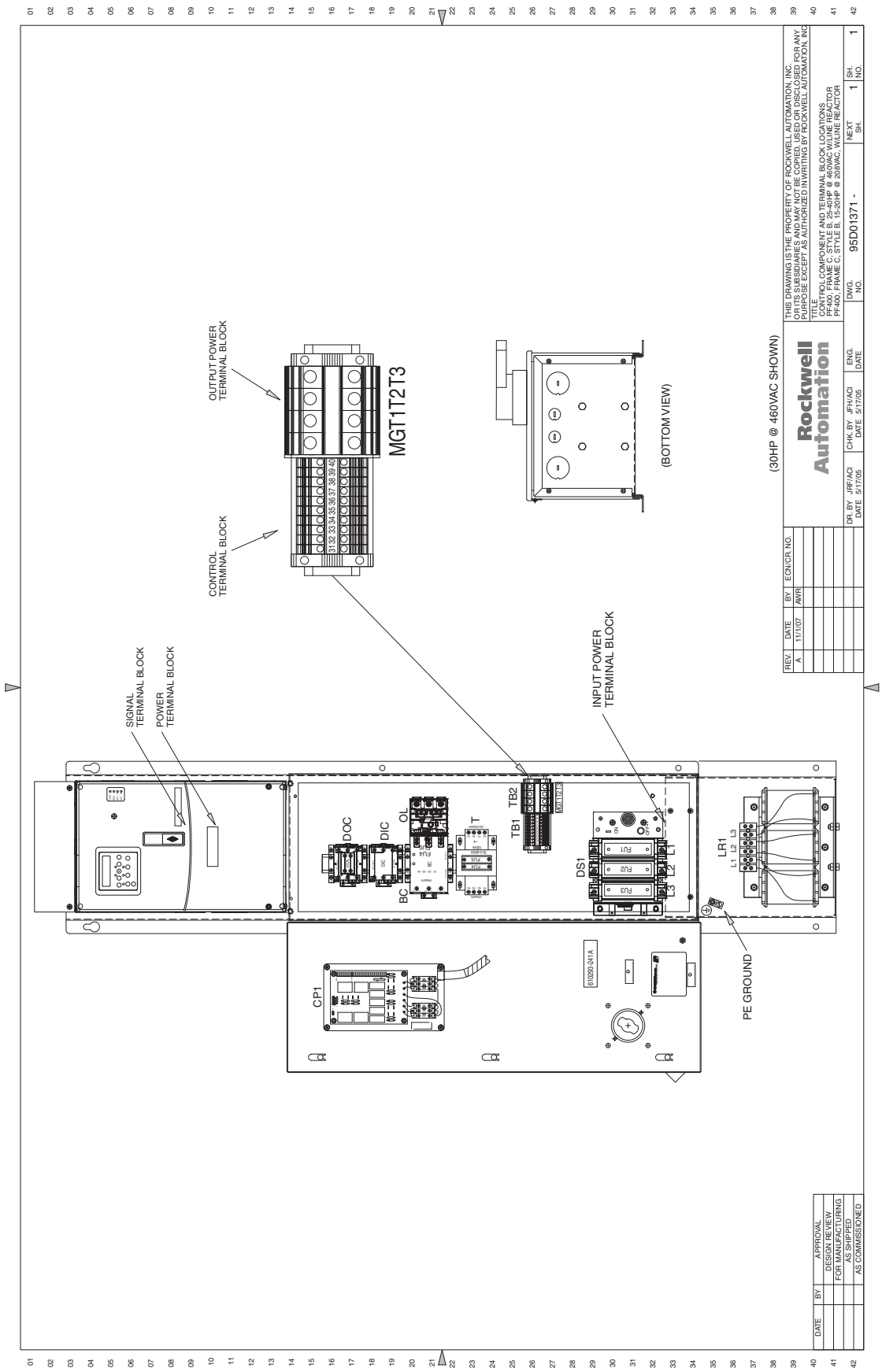


**Figure 2.38 25 Hp, 208V AC Drives with Line Reactor - NEMA/UL Type 1**

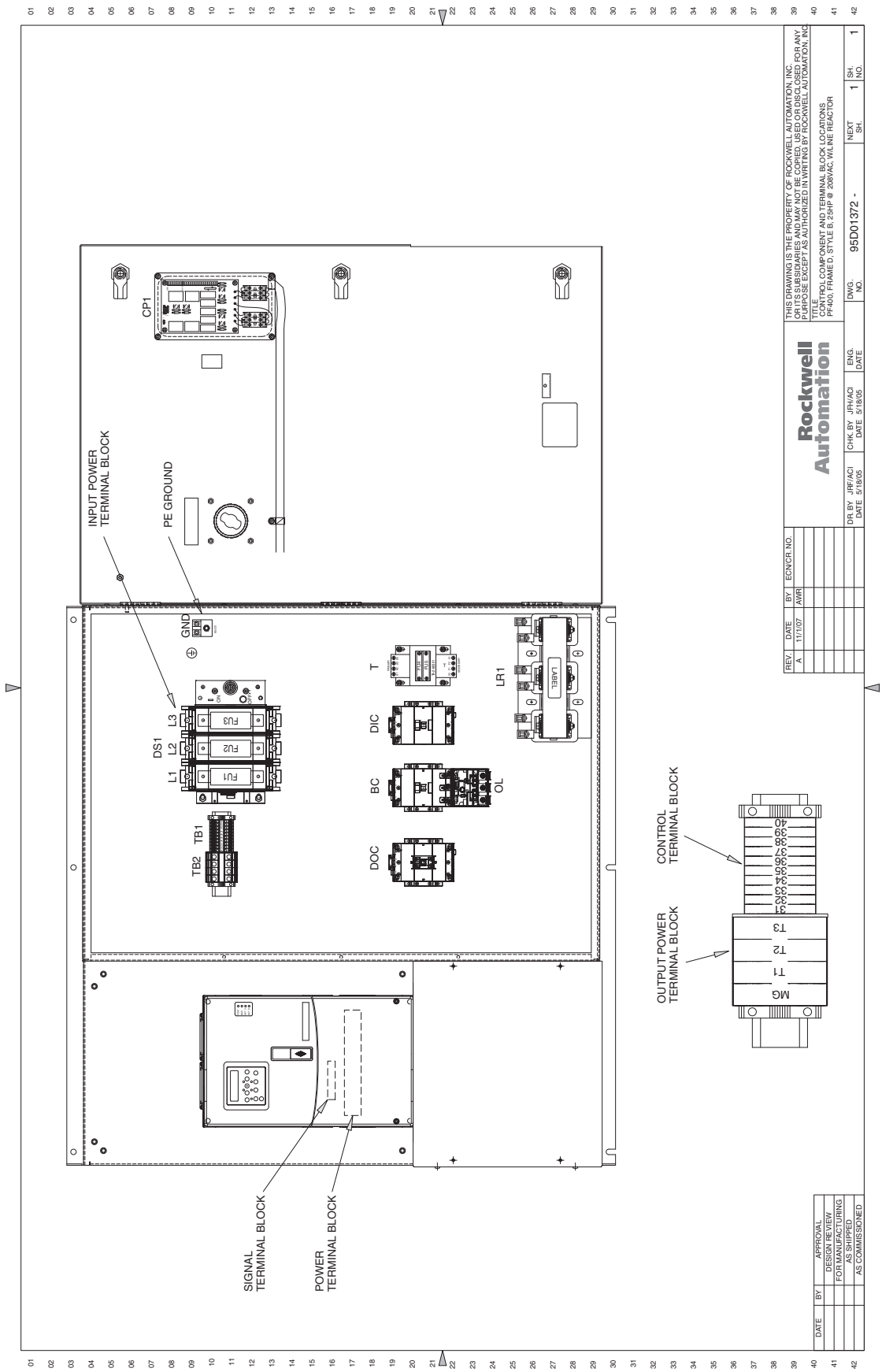


**Figure 2.39 50…60 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1**

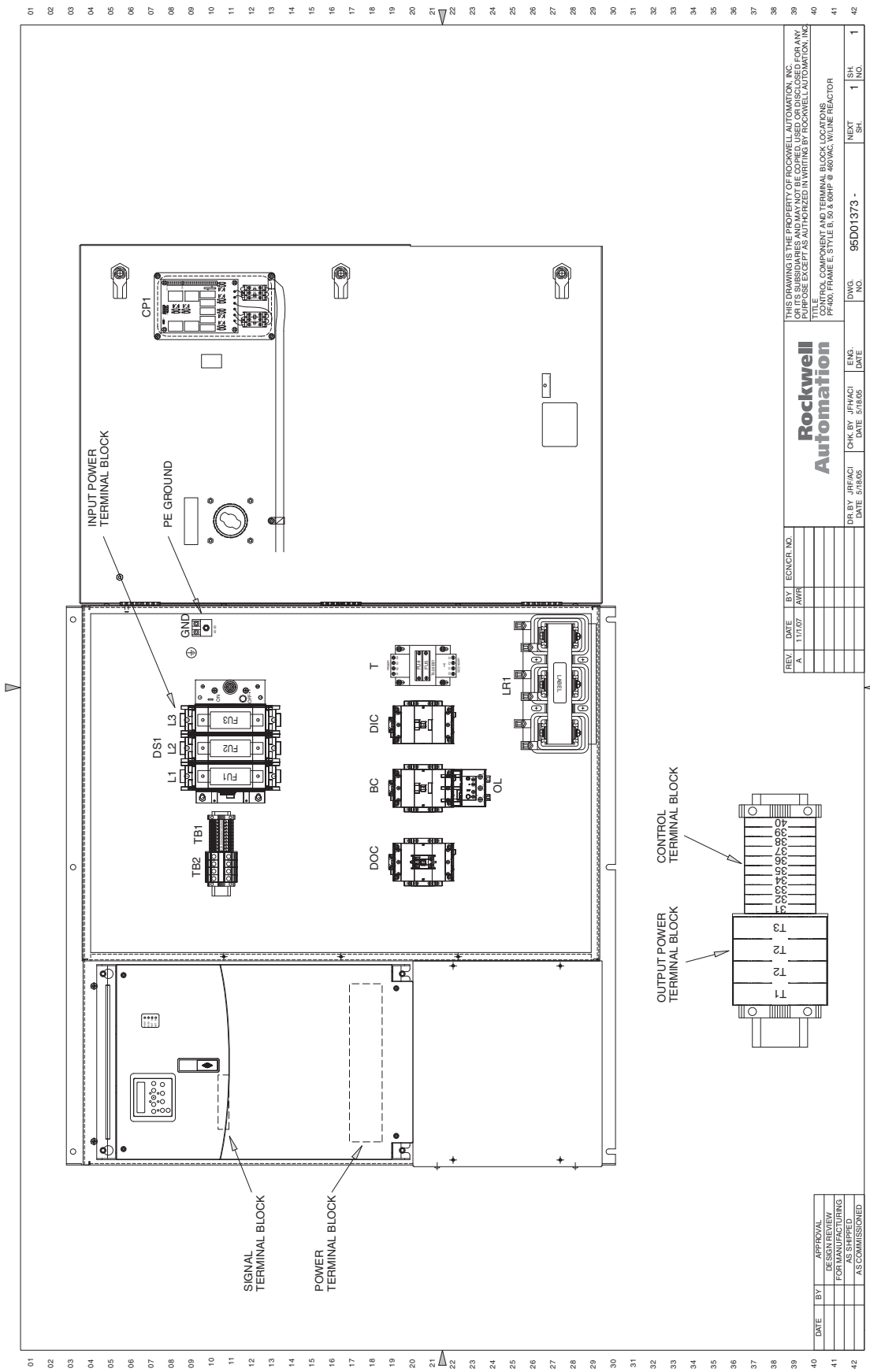


**Figure 2.40 30 Hp, 208V AC Drives with Line Reactor - NEMA/UL Type 1**

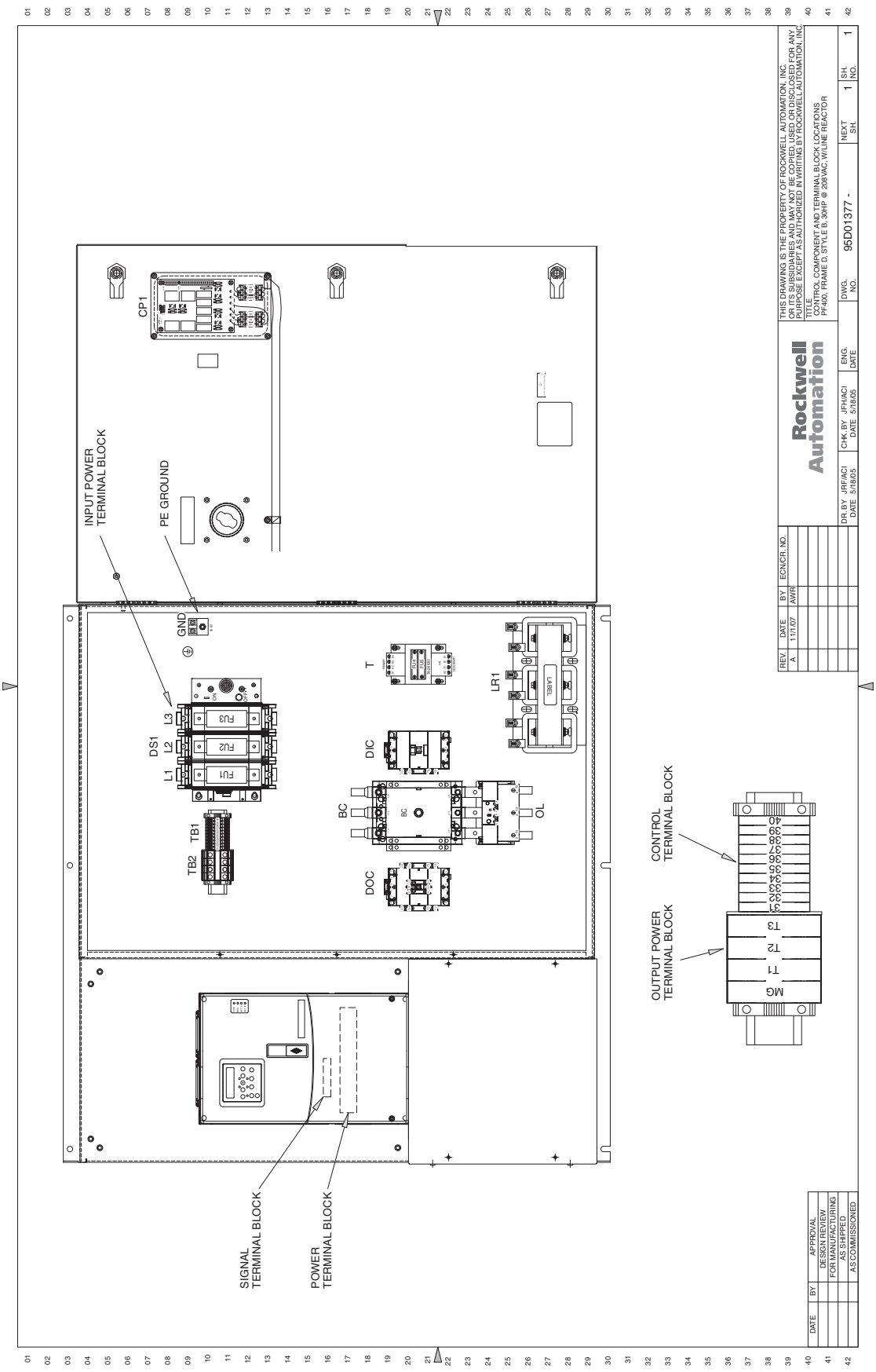


**Figure 2.41 40…50 Hp, 208V AC & 75…100 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1**

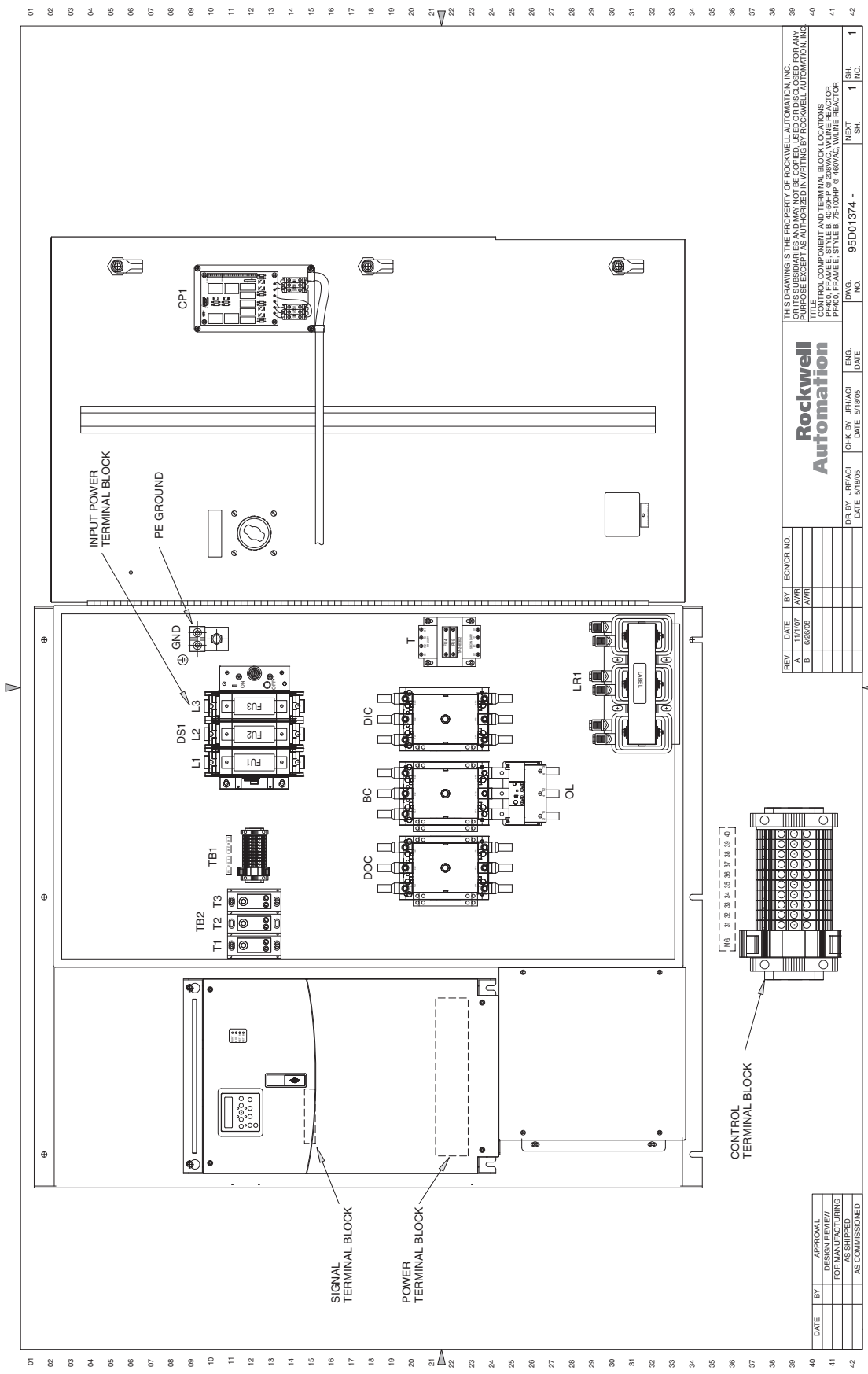


**Figure 2.42 3.0…10 Hp, 208V AC & 3.0…20 Hp, 460V AC Drives - NEMA/UL Type 12**

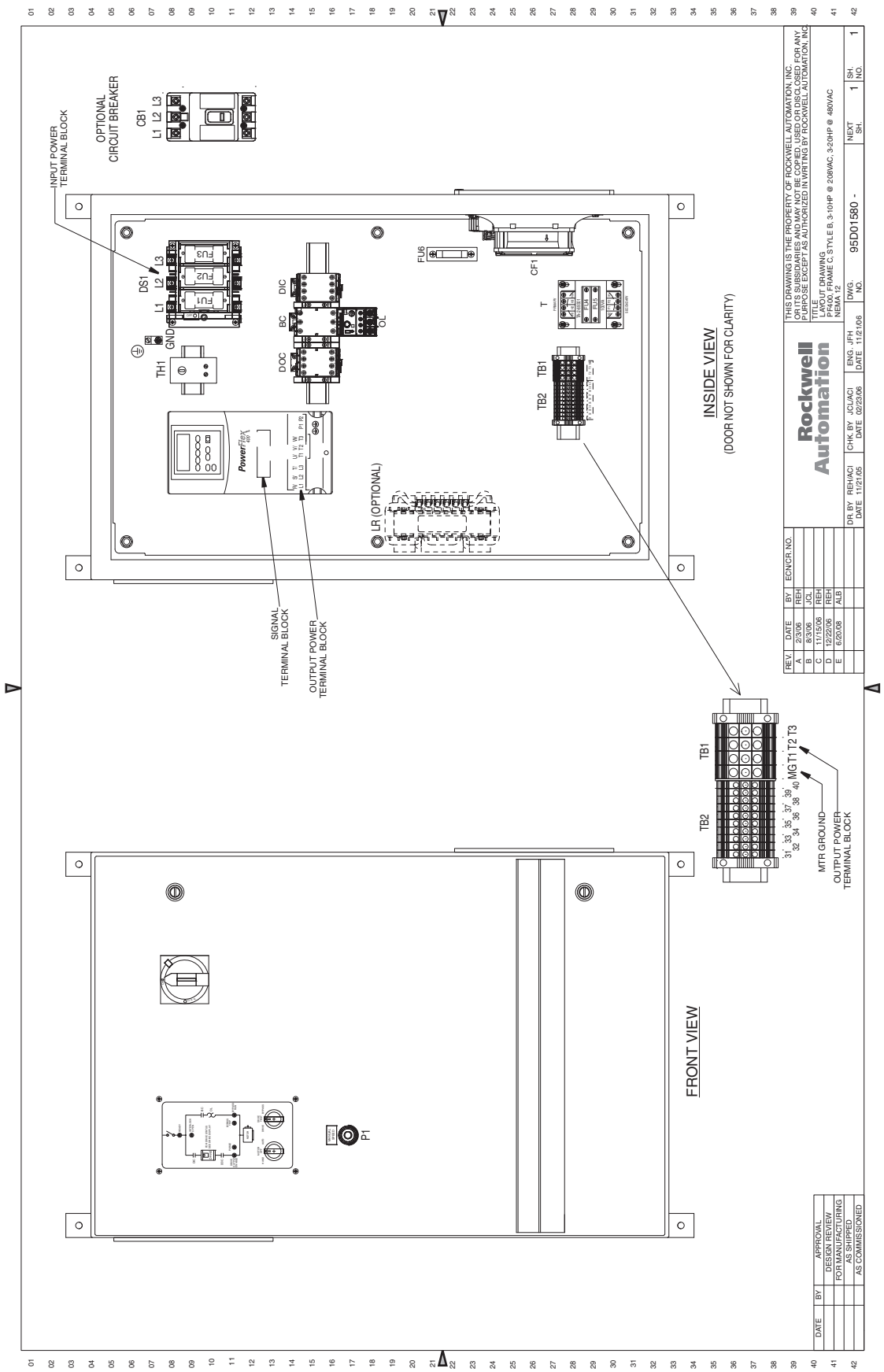


**Figure 2.43 15…20 Hp, 208V AC & 25…40 Hp, 460V AC Drives - NEMA/UL Type 12**

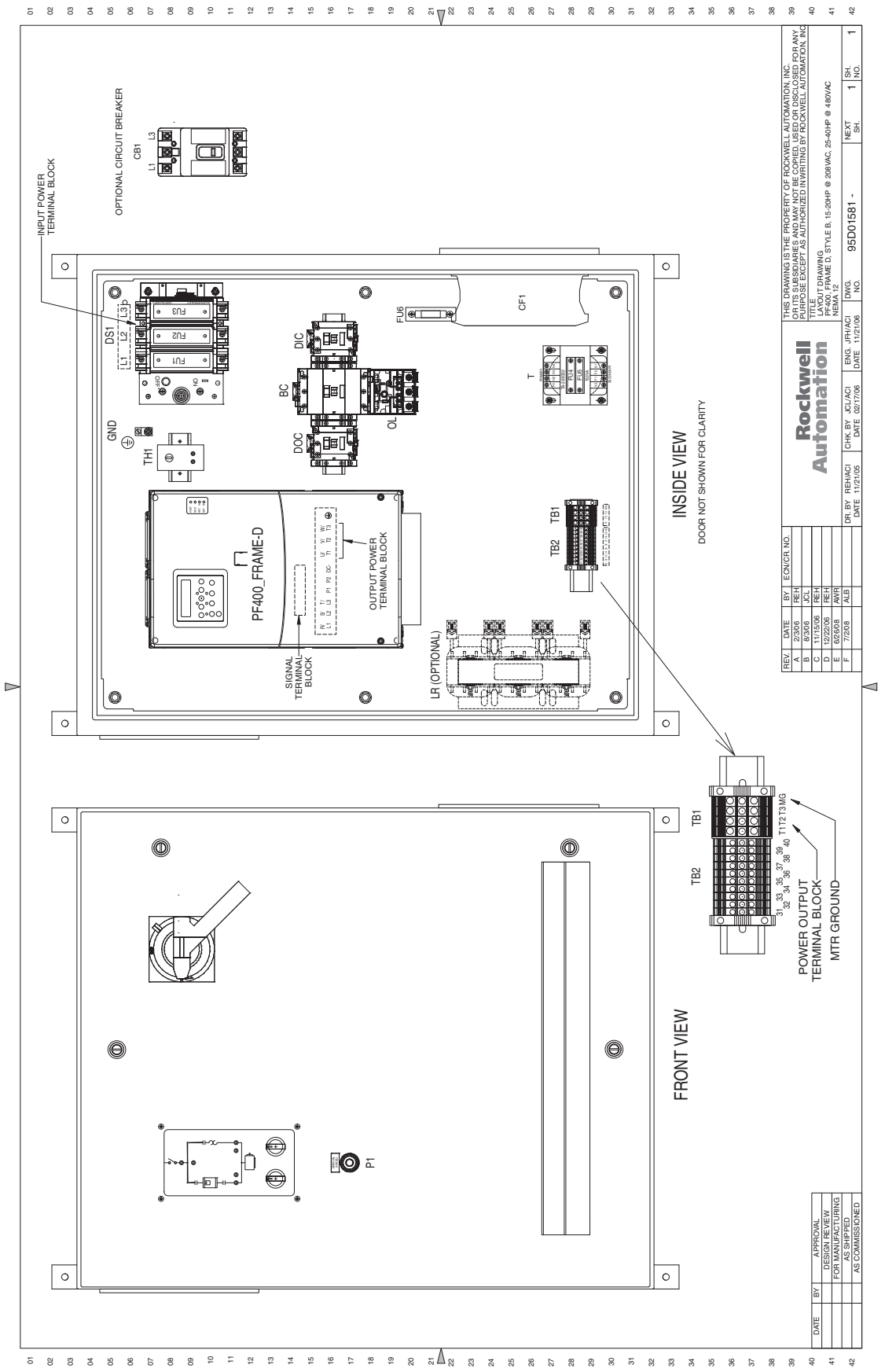


**Figure 2.44 25…30 Hp, 208V AC & 50…60 Hp, 460V AC Drives - NEMA/UL Type 12**

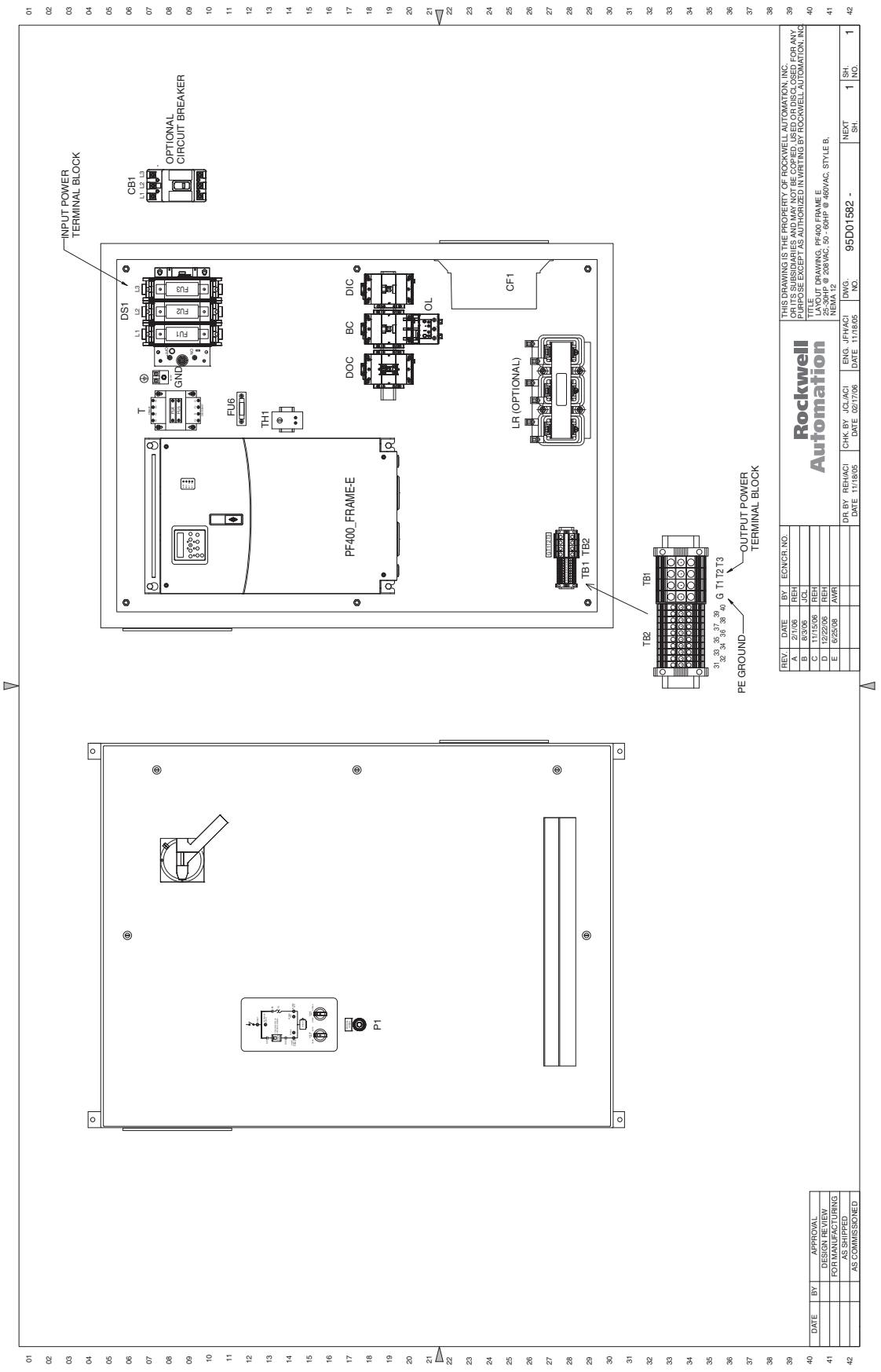


**Figure 2.45 40…50 Hp, 208V AC & 75…100 Hp, 460V AC Drives - NEMA/UL Type 12**

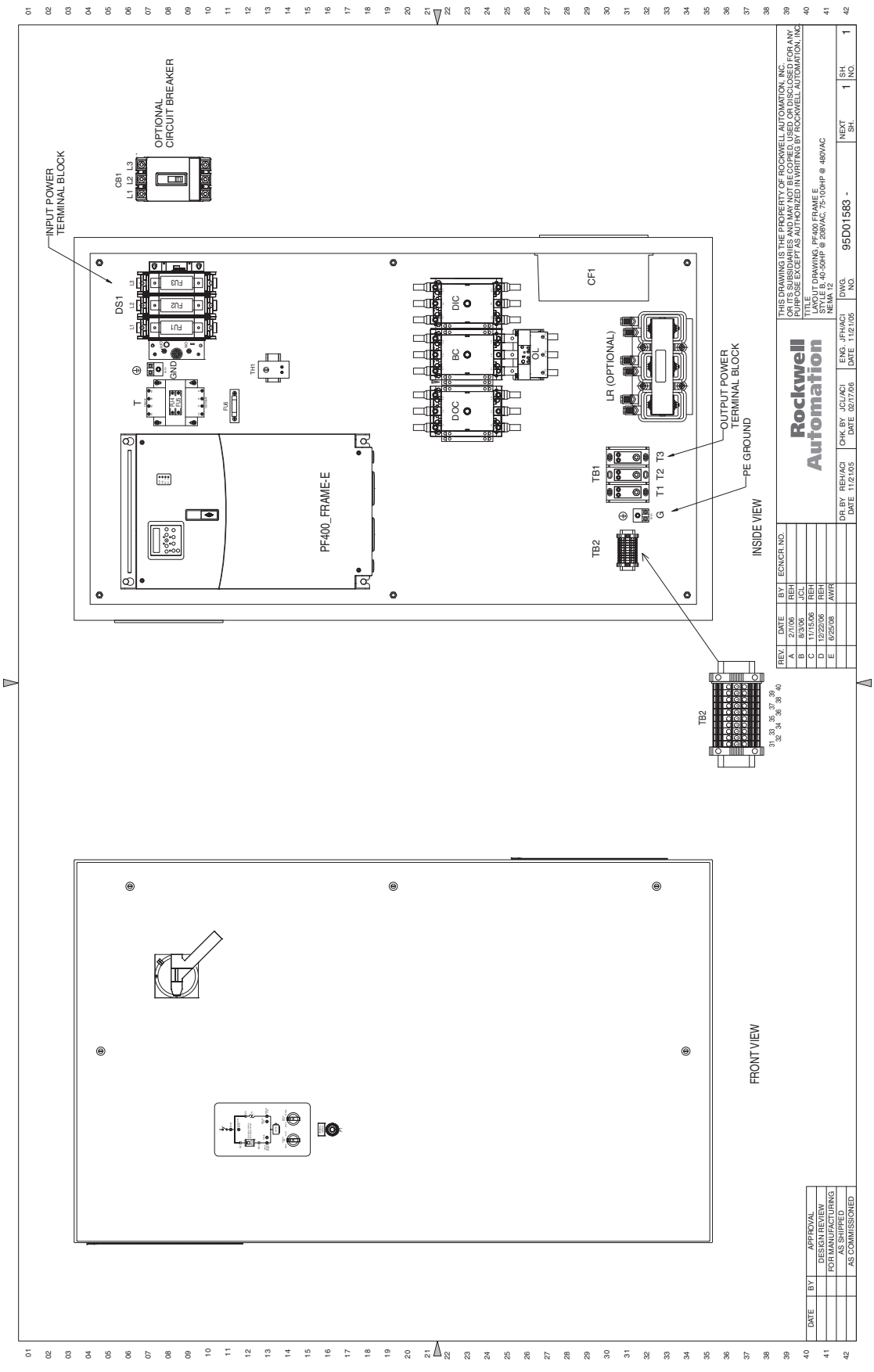


**Figure 2.46 125…150 Hp, 460V AC Drives - NEMA/UL Type 12**

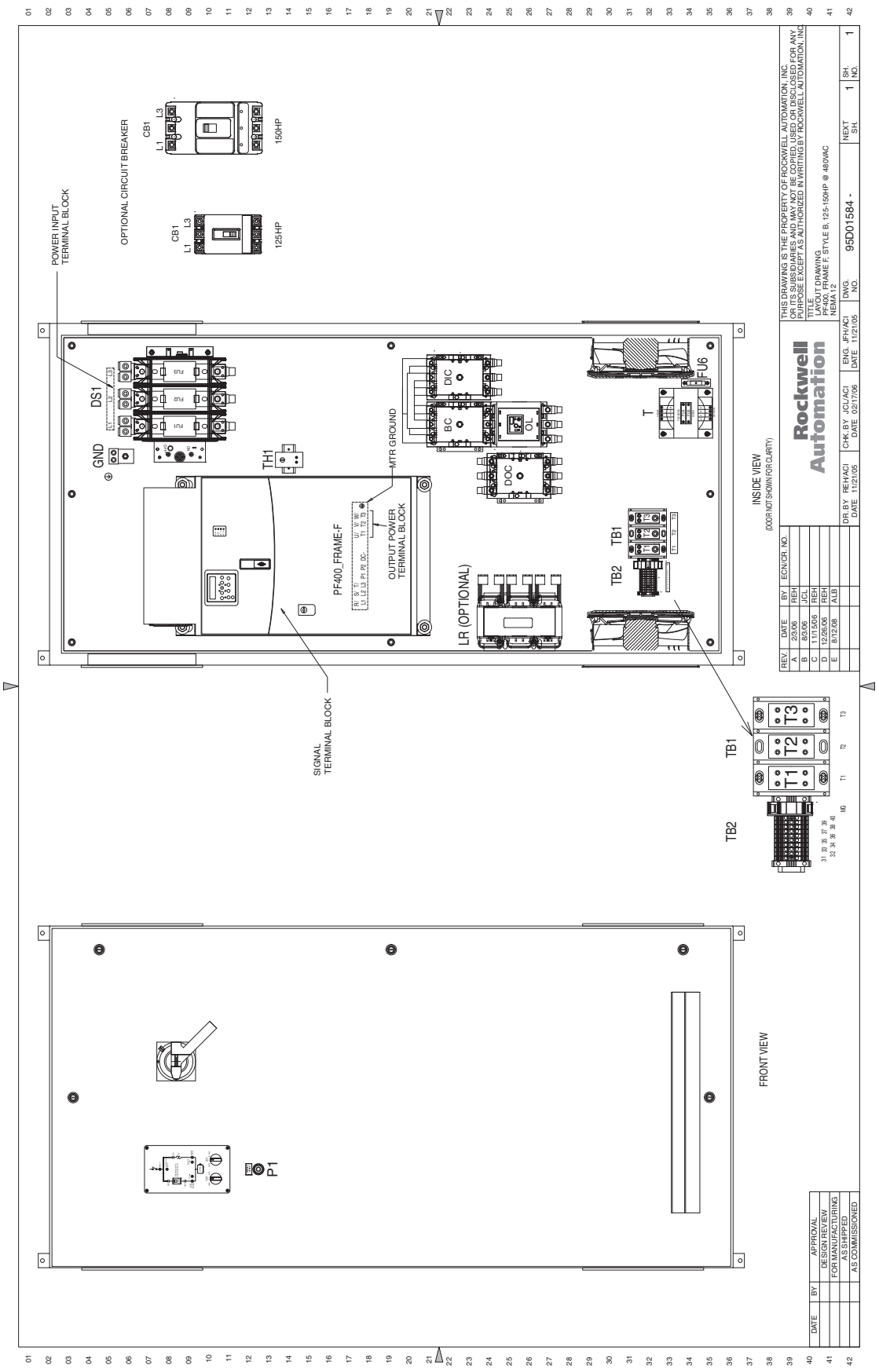


**Figure 2.47 3.0…5.0 Hp, 460V AC Drives - NEMA/UL Type 4**

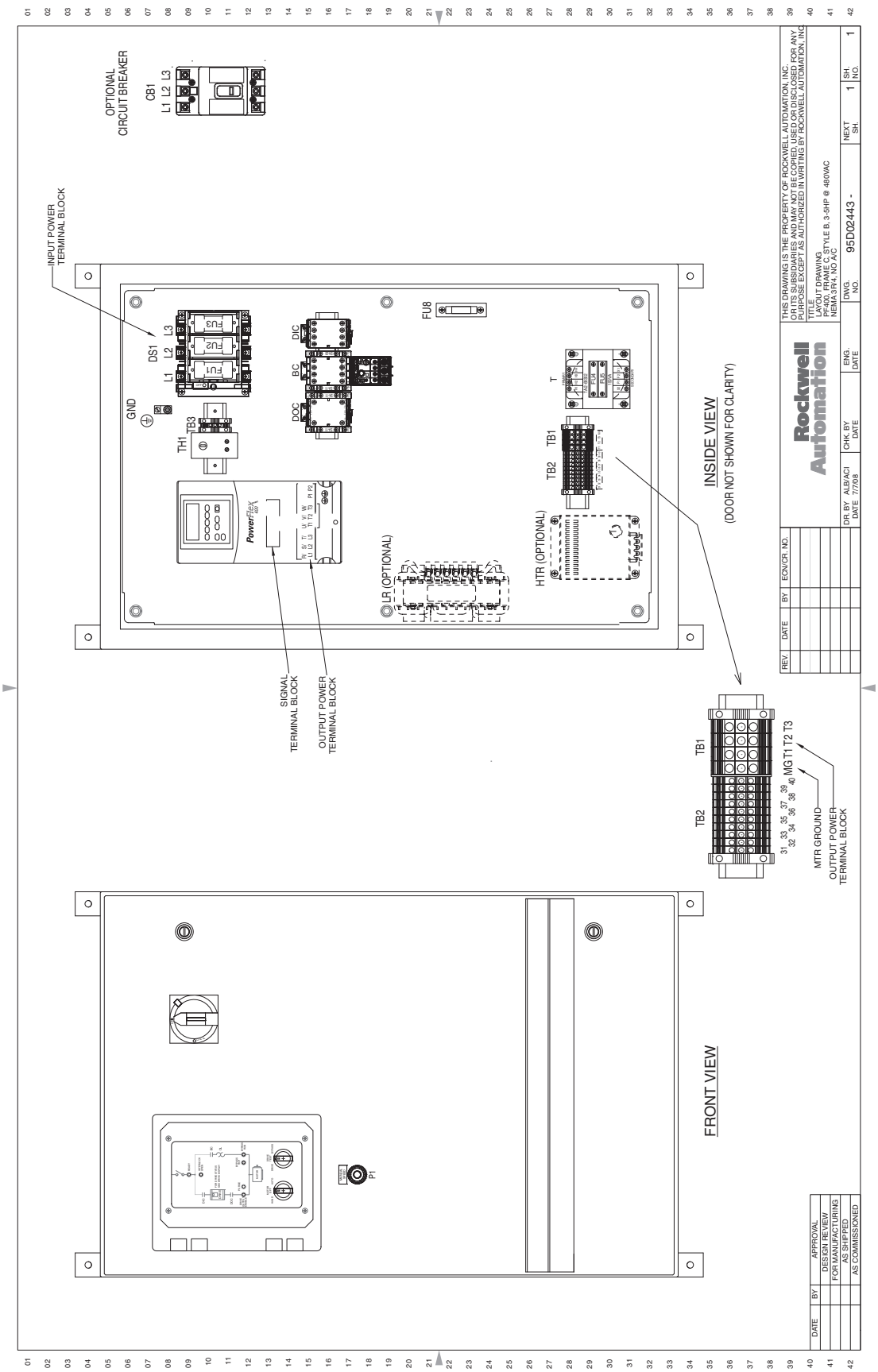


**Figure 2.48 5.0…10 Hp, 208V AC & 7.5…20 Hp, 460V AC Drives - NEMA/UL Type 4**

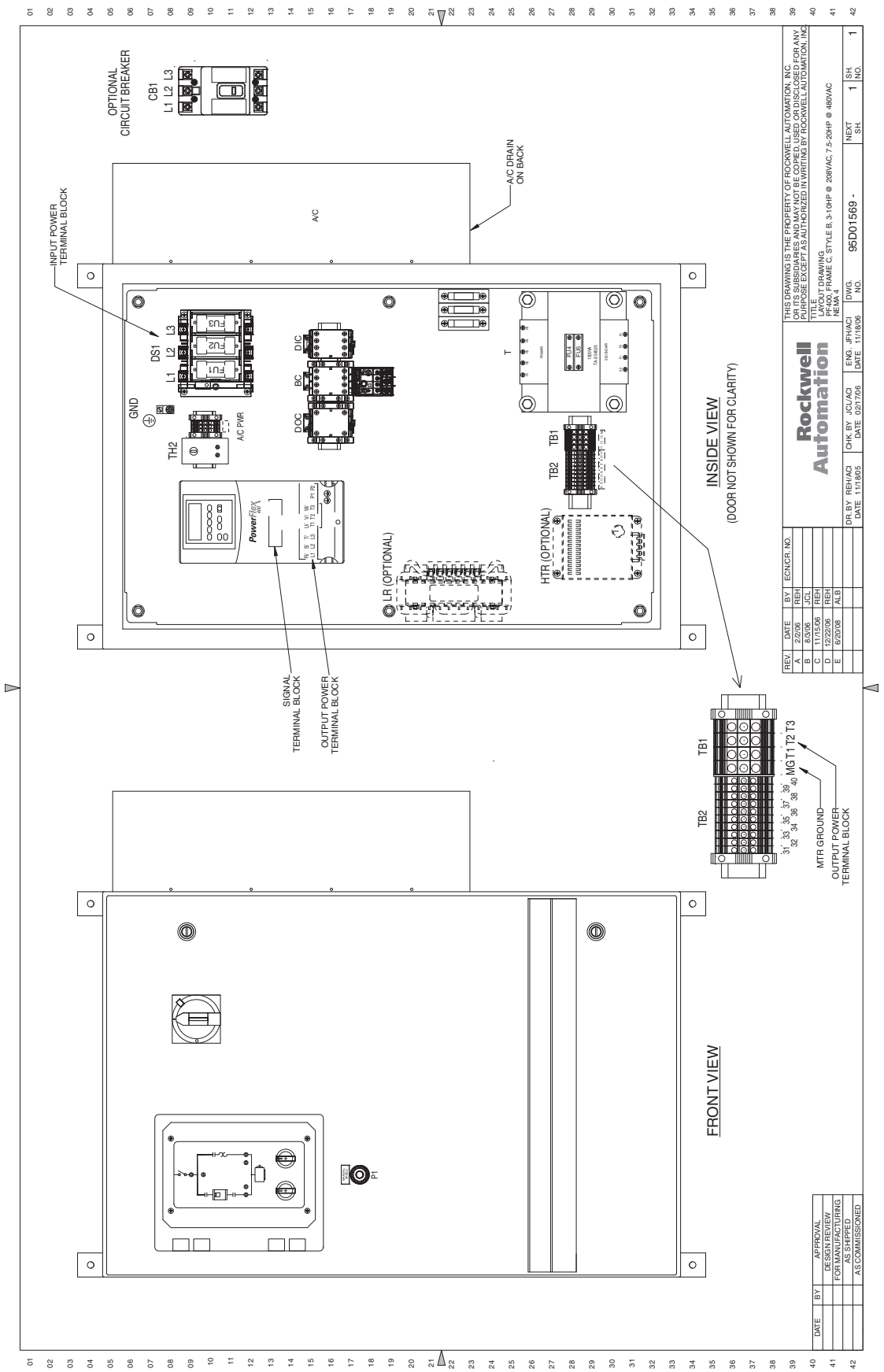
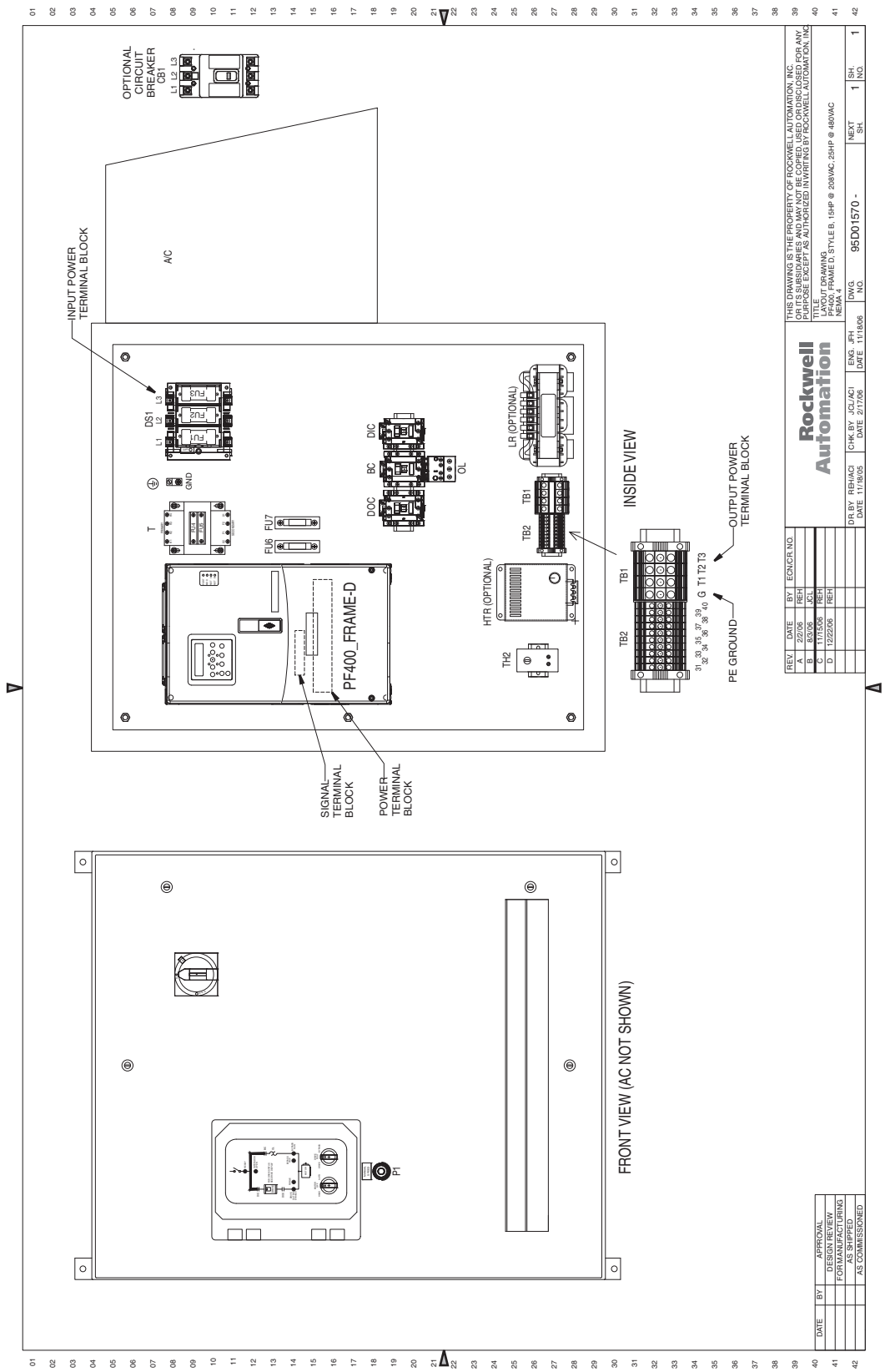


**Figure 2.49 15 Hp, 208V AC & 25 Hp, 460V AC Drives - NEMA/UL Type 4**


OPTIONAL CIRCUIT BREAKER CB1
INPUT POWER TERMINAL BLOCK
A/C
PF400_FRAME-D
INSIDE VIEW
OUTPUT POWER TERMINAL BLOCK
PE GROUND
SIGNAL TERMINAL BLOCK
POWER TERMINAL BLOCK
FRONT VIEW (AC NOT SHOWN)
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TITLE: LAYOUT DRAWING PF400, FRAME D, STYLE B, 15HP @ 208VAC, 25HP @ 480VAC NEMA 4
DWG. NO. 95D01570 -
APPROVAL
DESIGN REVIEW
FOR MANUFACTURING
AS SHIPPED
AS COMMISSIONED

**Figure 2.50 15…20 Hp, 208V AC & 25…40 Hp, 460V AC Drives - NEMA/UL Type 4**

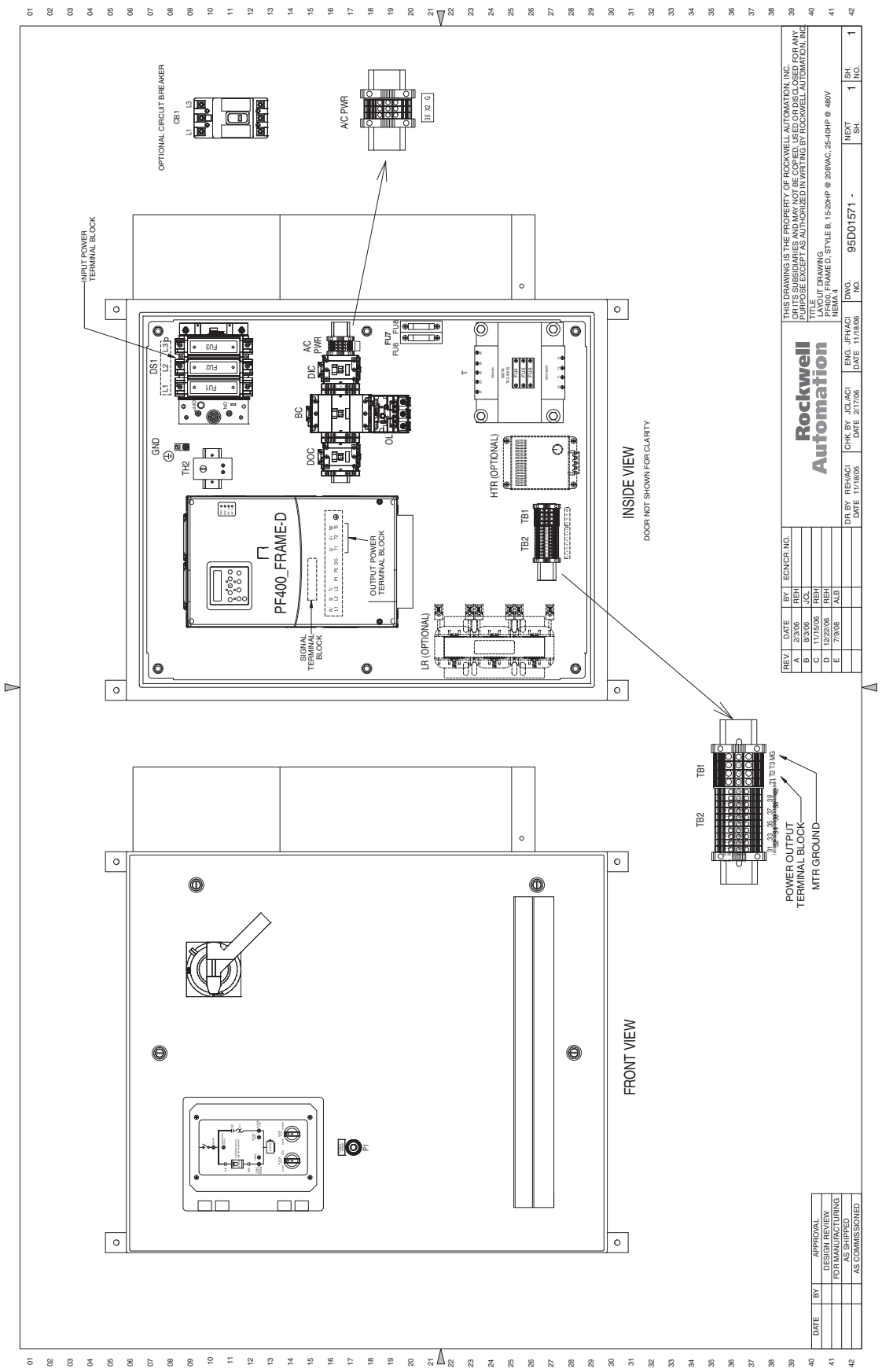


**Figure 2.51 25…30 Hp, 208V AC & 50…60 Hp, 460V AC Drives - NEMA/UL Type 4**

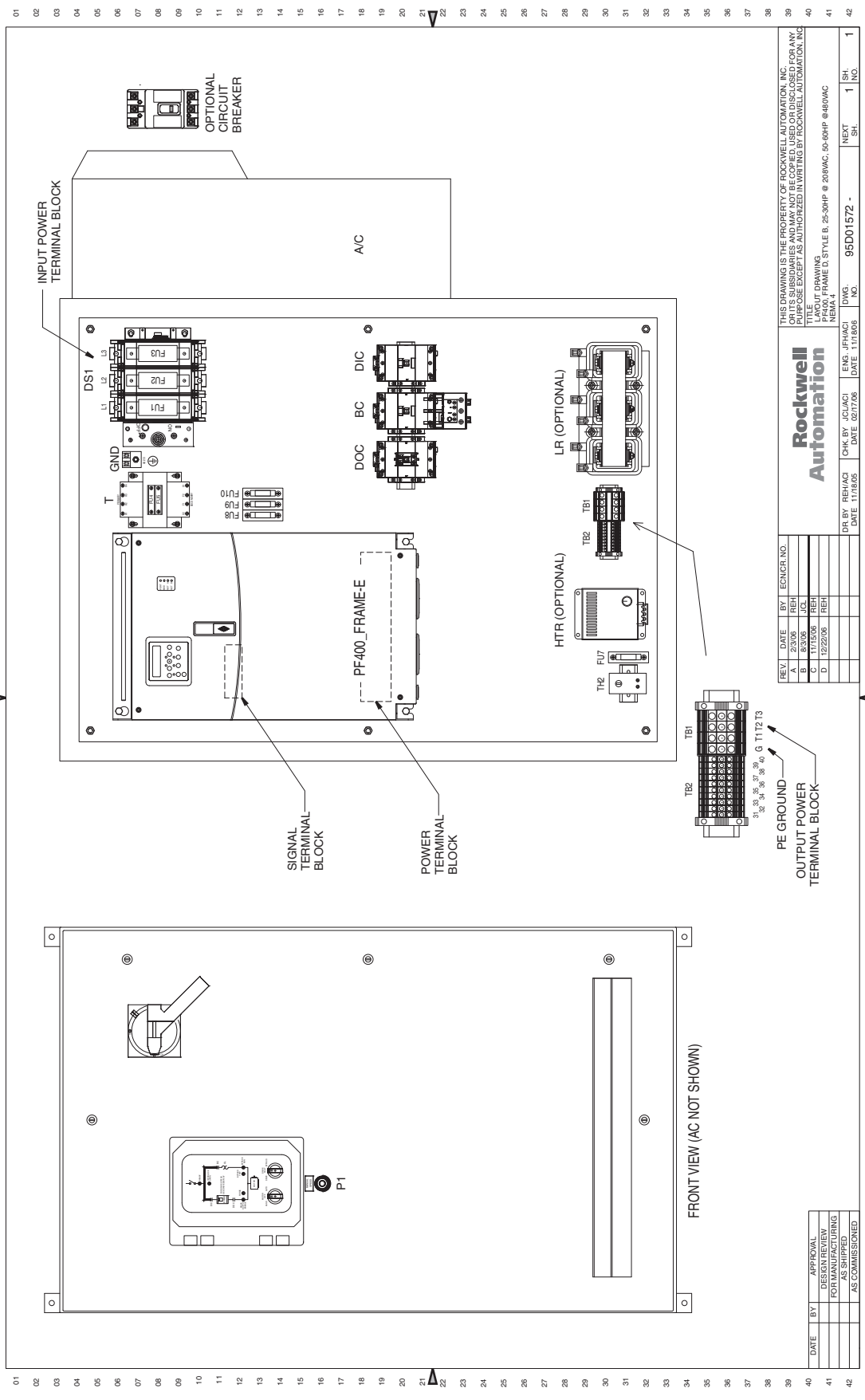


**Figure 2.52 40…50 Hp, 208V AC & 75…100 Hp, 460V AC Drives - NEMA/UL Type 4**

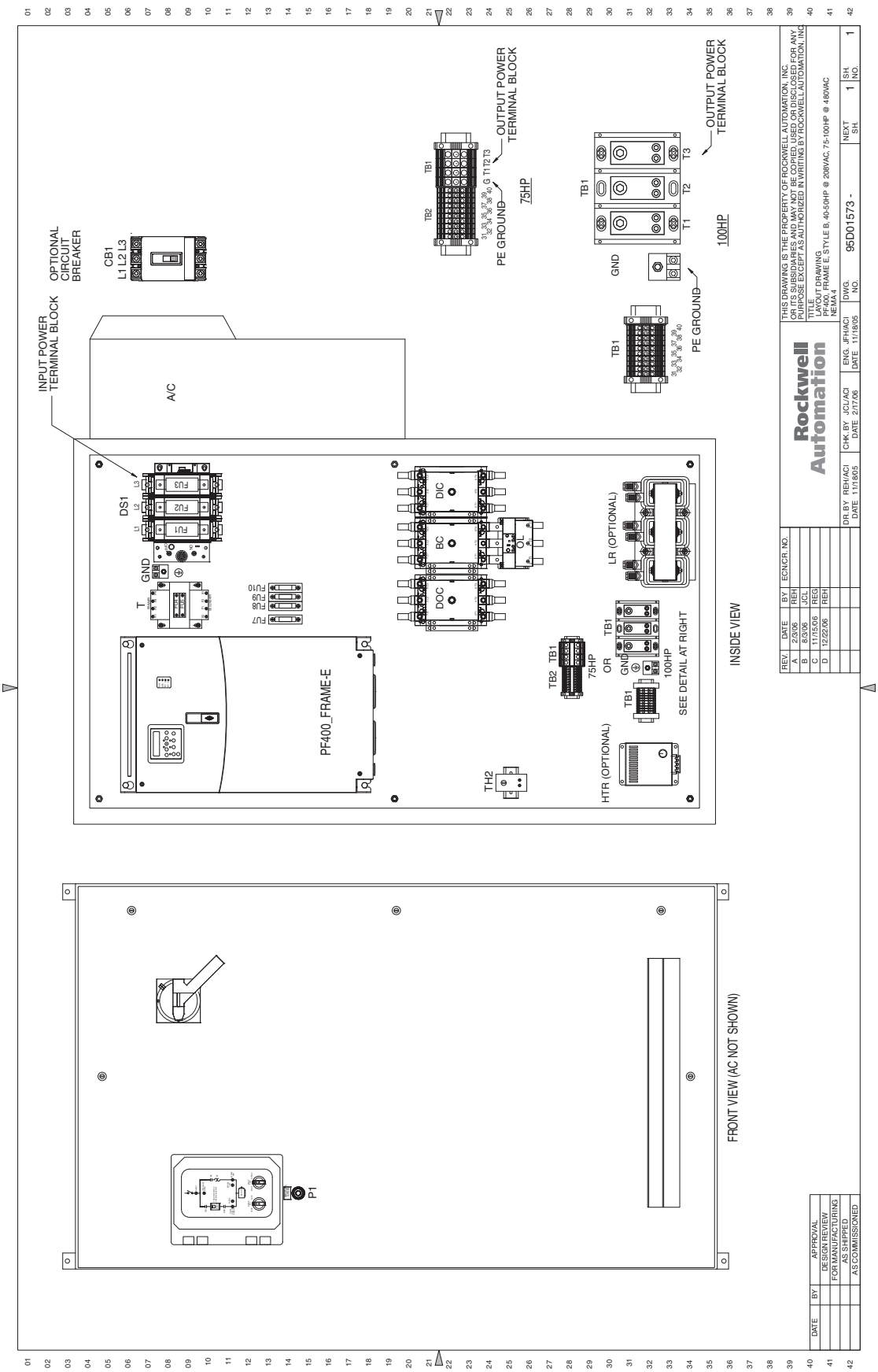


**Figure 2.53 125…150 Hp, 460V AC Drives - NEMA/UL Type 4**

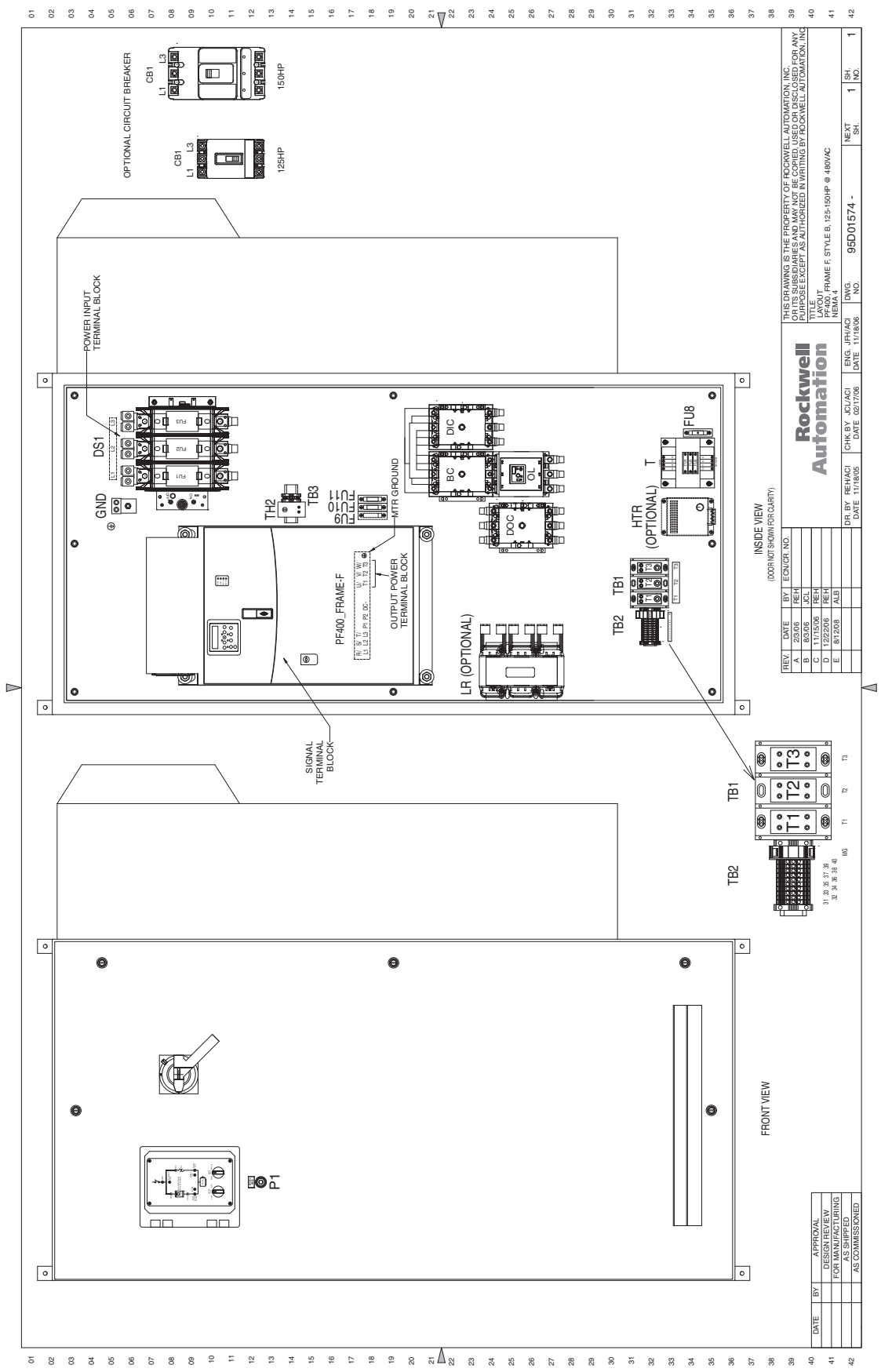


**Figure 2.54 3.0…10 Hp, 208V AC & 3.0…20 Hp, 460V AC Drives - NEMA/UL Type 3R**

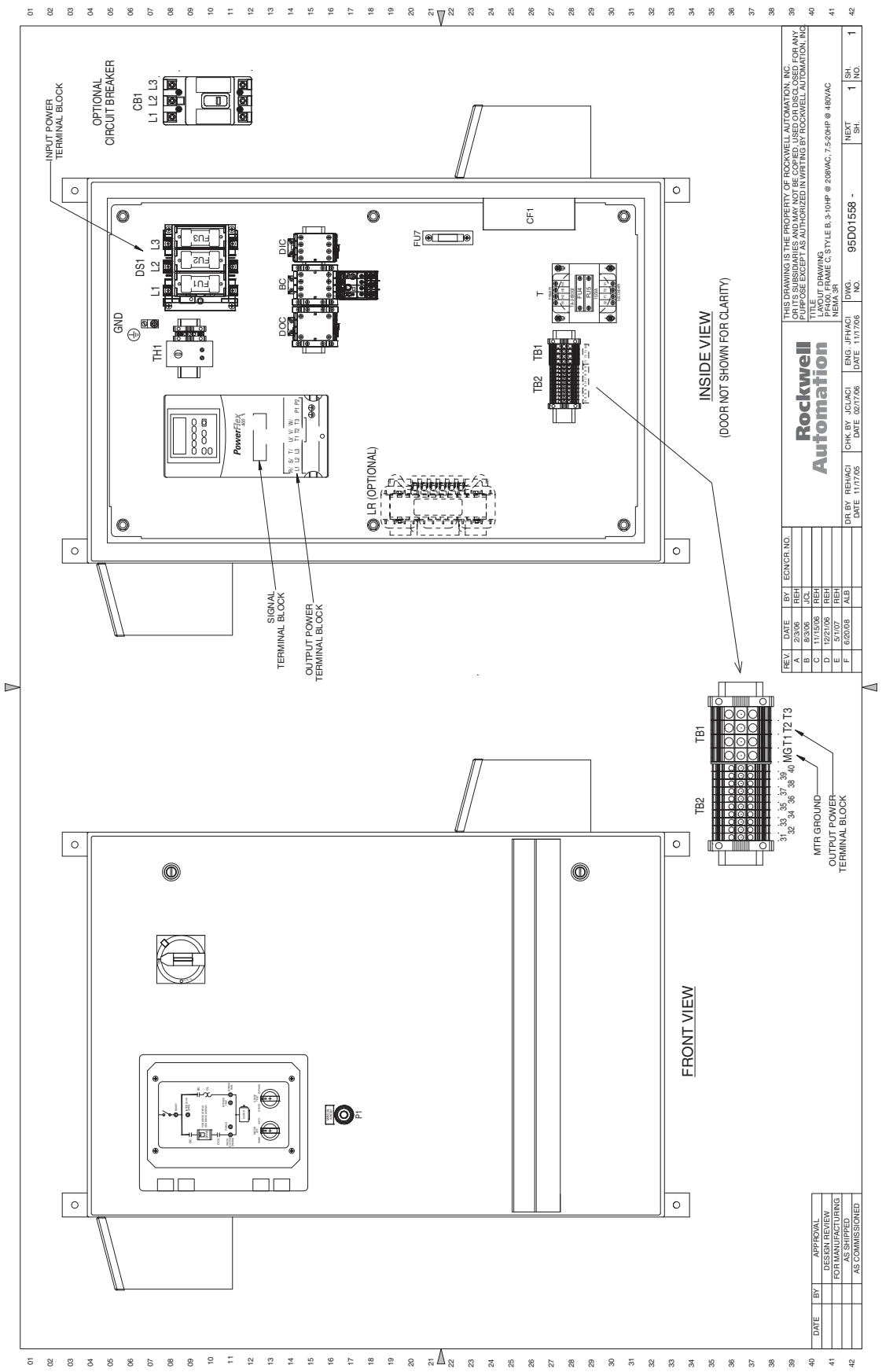


**Figure 2.55 15…30 Hp, 208V AC & 25…40 Hp, 460V AC Drives - NEMA/UL Type 3R**

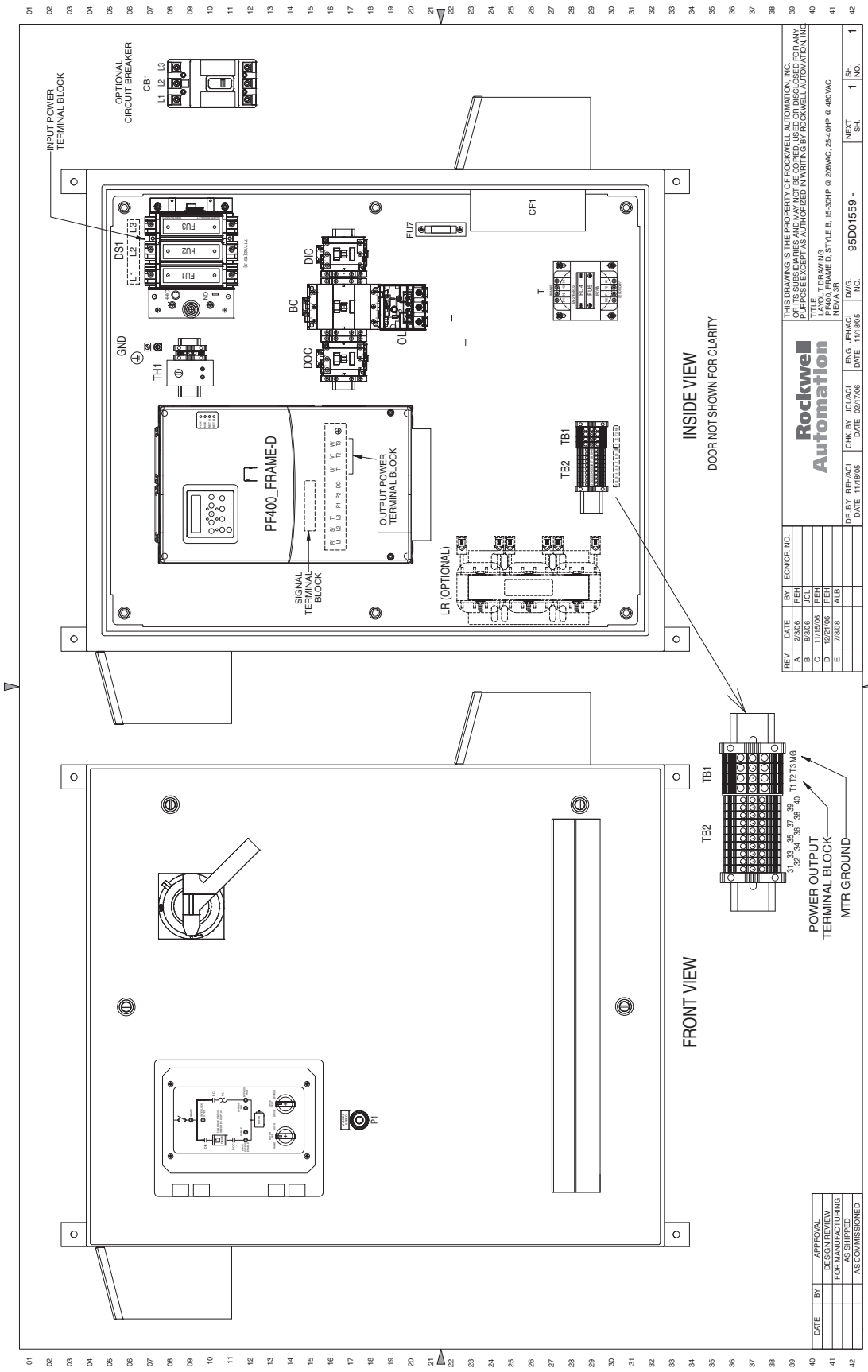


**Figure 2.56 50...60 Hp, 460V AC Drives - NEMA/UL Type 3R**

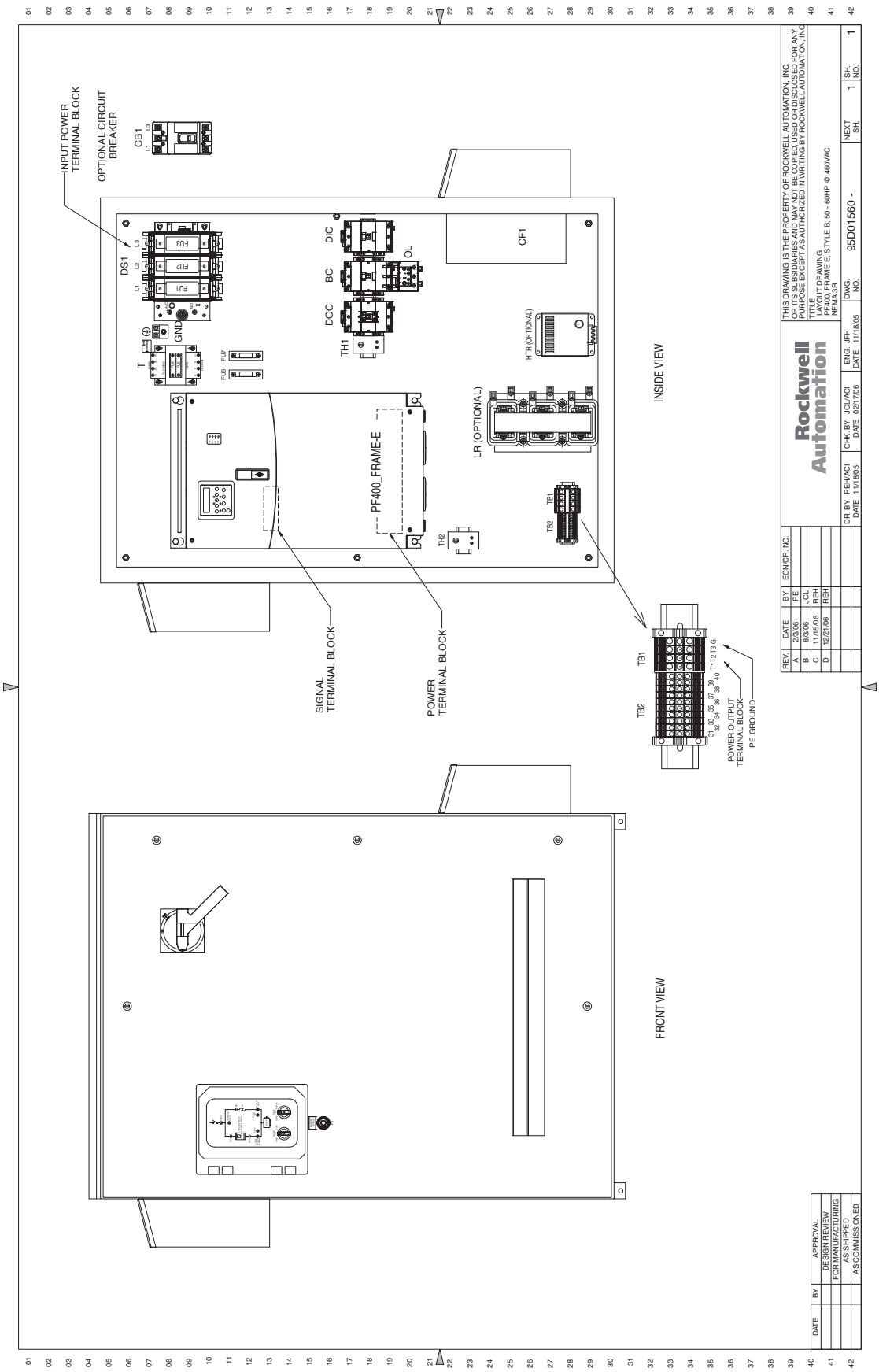


**Figure 2.57 40…50 Hp, 208V AC & 75…100 Hp, 460V AC Drives - NEMA/UL Type 3R**

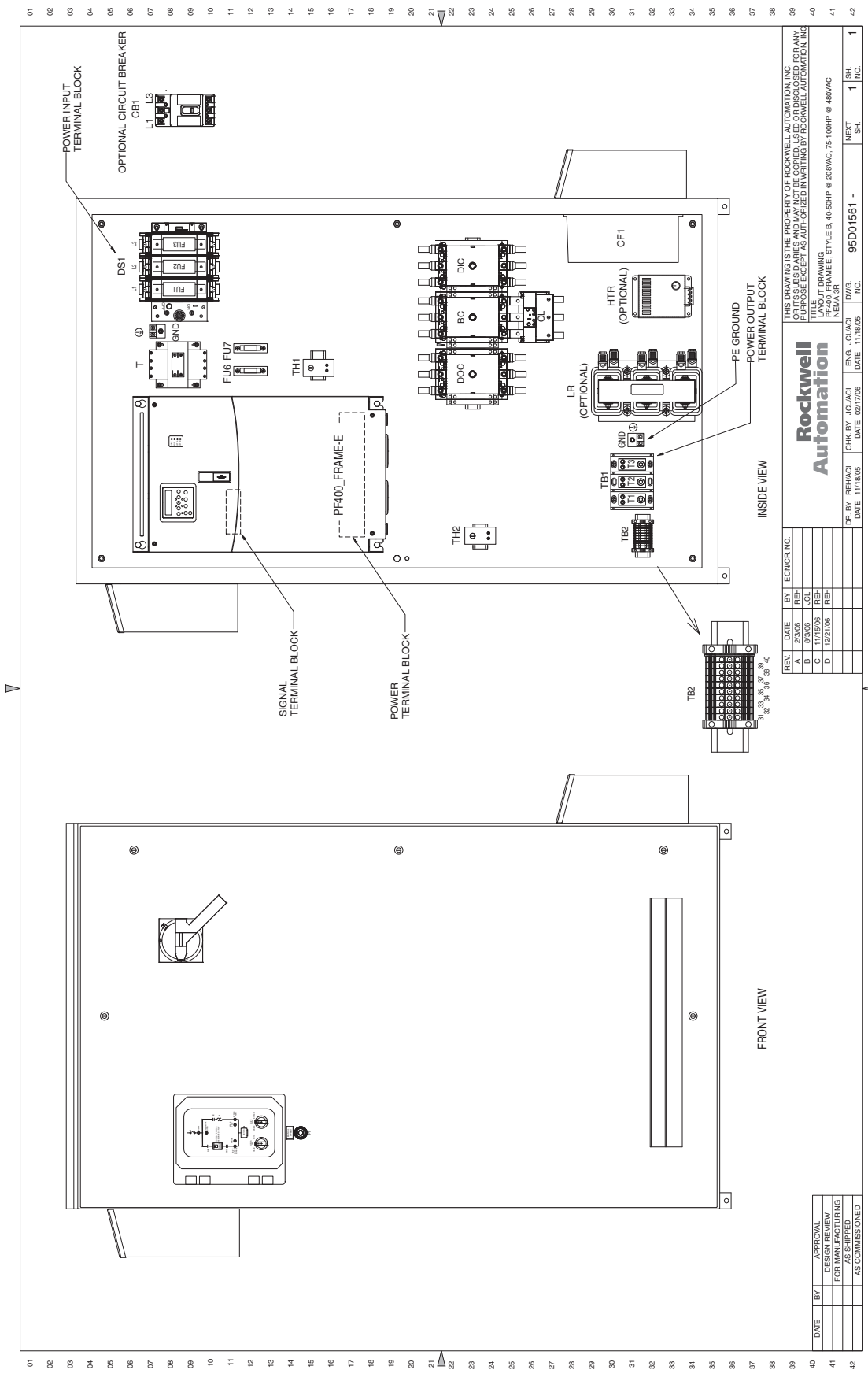
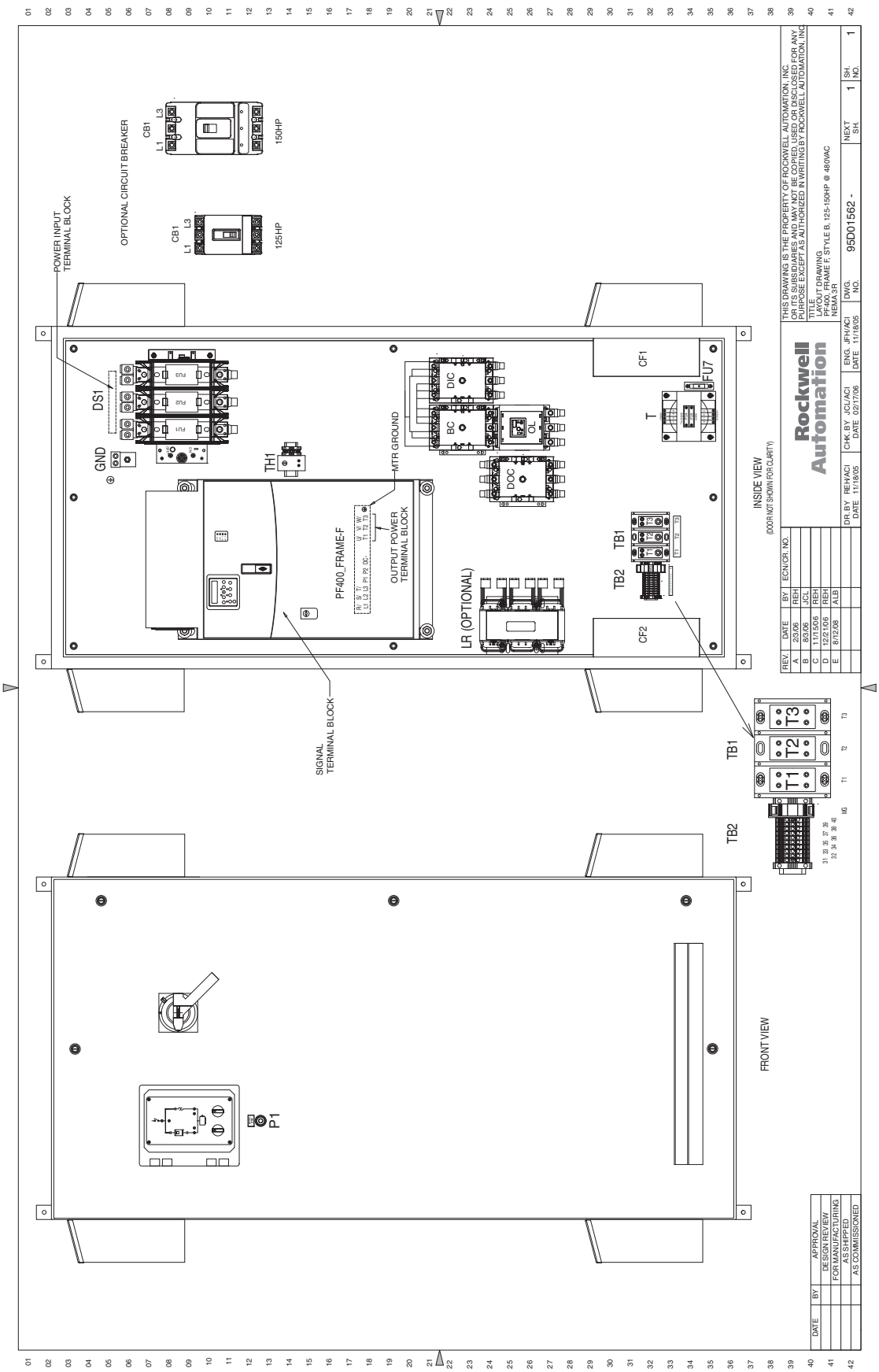


**Figure 2.58 125…150 Hp, 460V AC Drives - NEMA/UL Type 3R**



## Outline Drawings

**Figure 2.59 3.0…5.0 Hp, 208V AC & 3.0…10 Hp, 460V AC Drives - NEMA/UL Type 1**

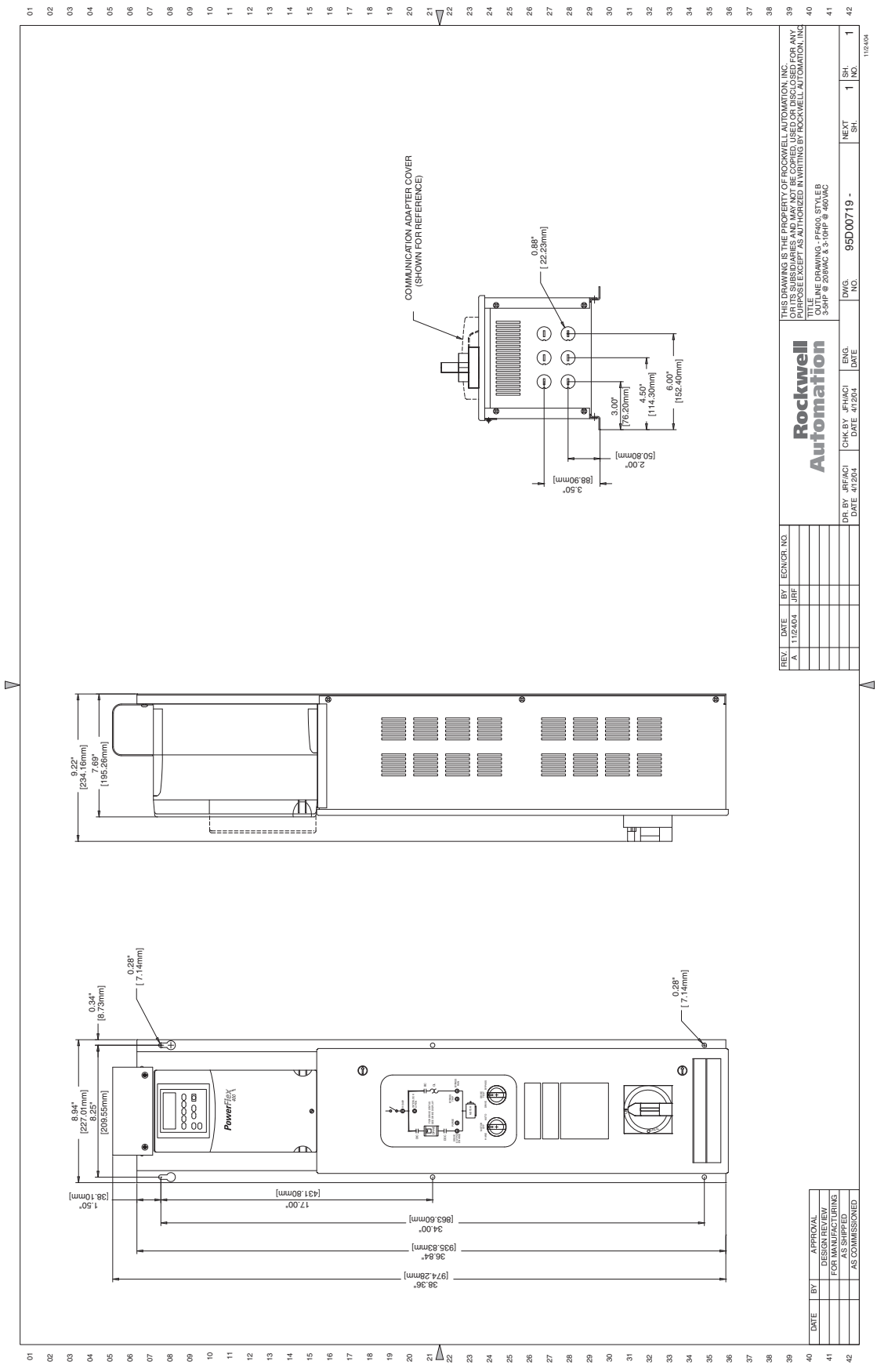


**Figure 2.60 7.5…10 Hp, 208V AC & 15…20 Hp, 460V AC Drives - NEMA/UL Type 1**

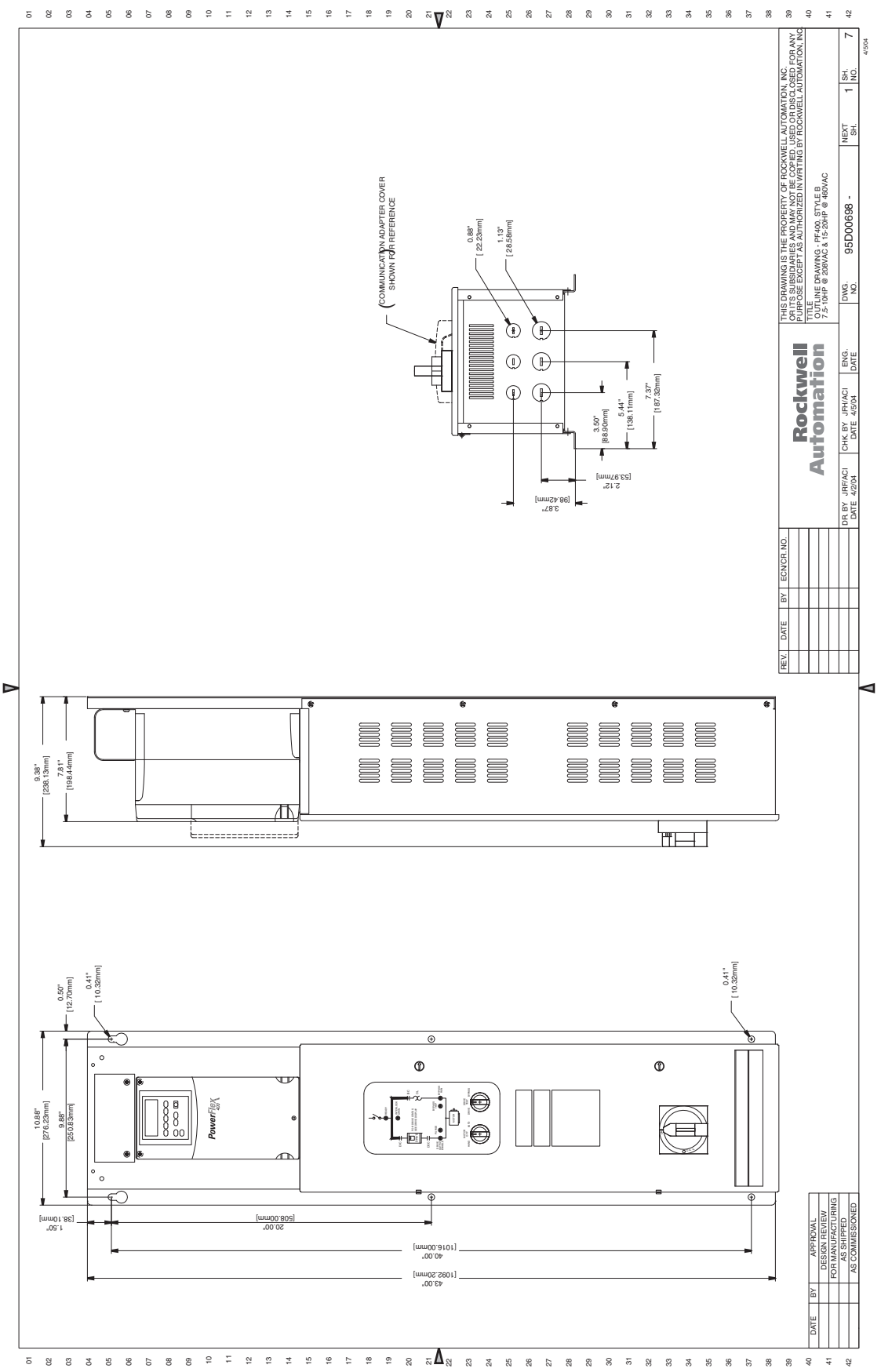


**Figure 2.61 15…20 Hp, 208V AC & 25…40 Hp, 460V AC Drives - NEMA/UL Type 1**

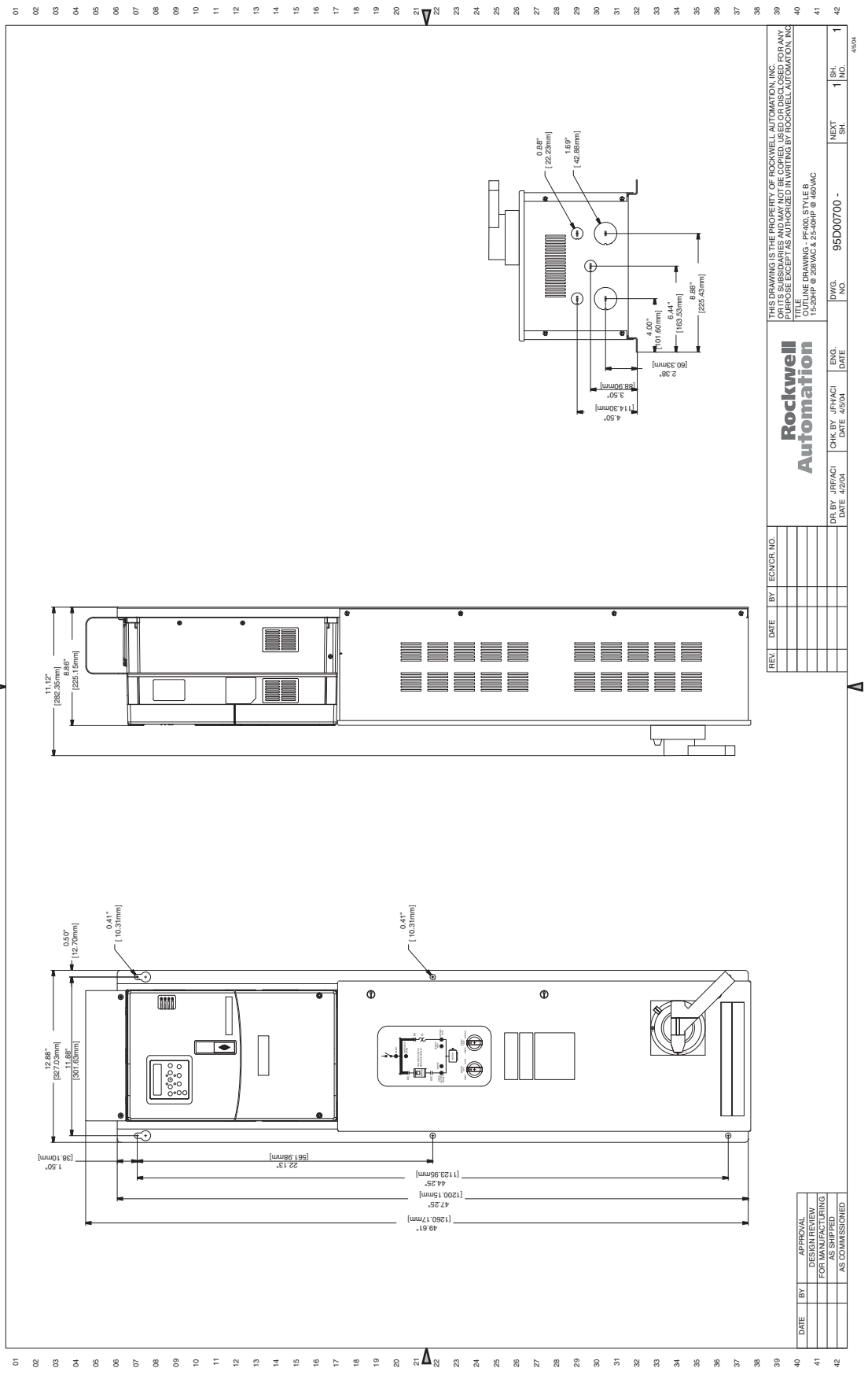


**Figure 2.62 25…30 Hp, 208V AC Drives - NEMA/UL Type 1**

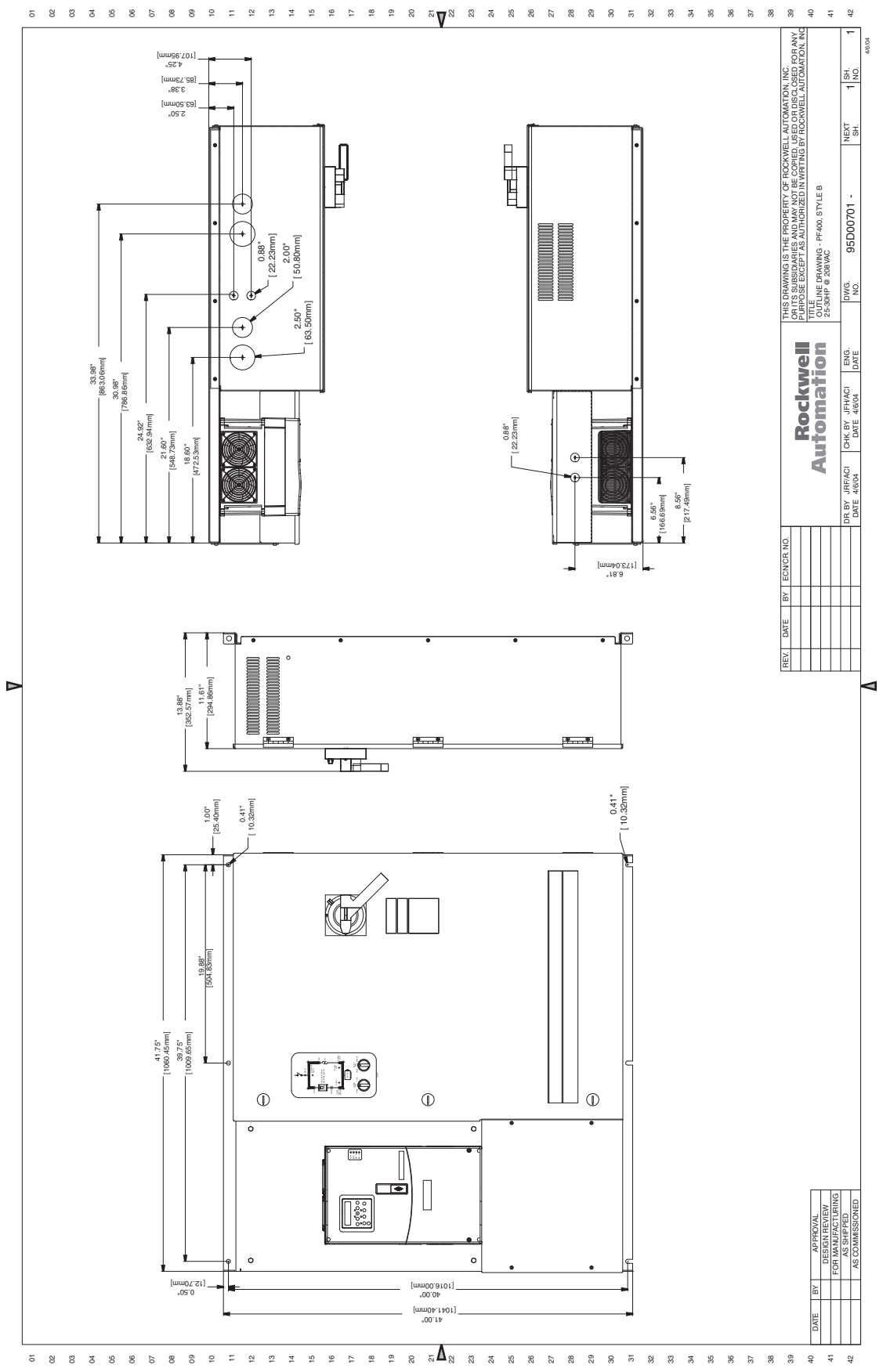


**Figure 2.63 40 Hp, 208V AC & 50...100 Hp, 460V AC Drives - NEMA/UL Type 1**

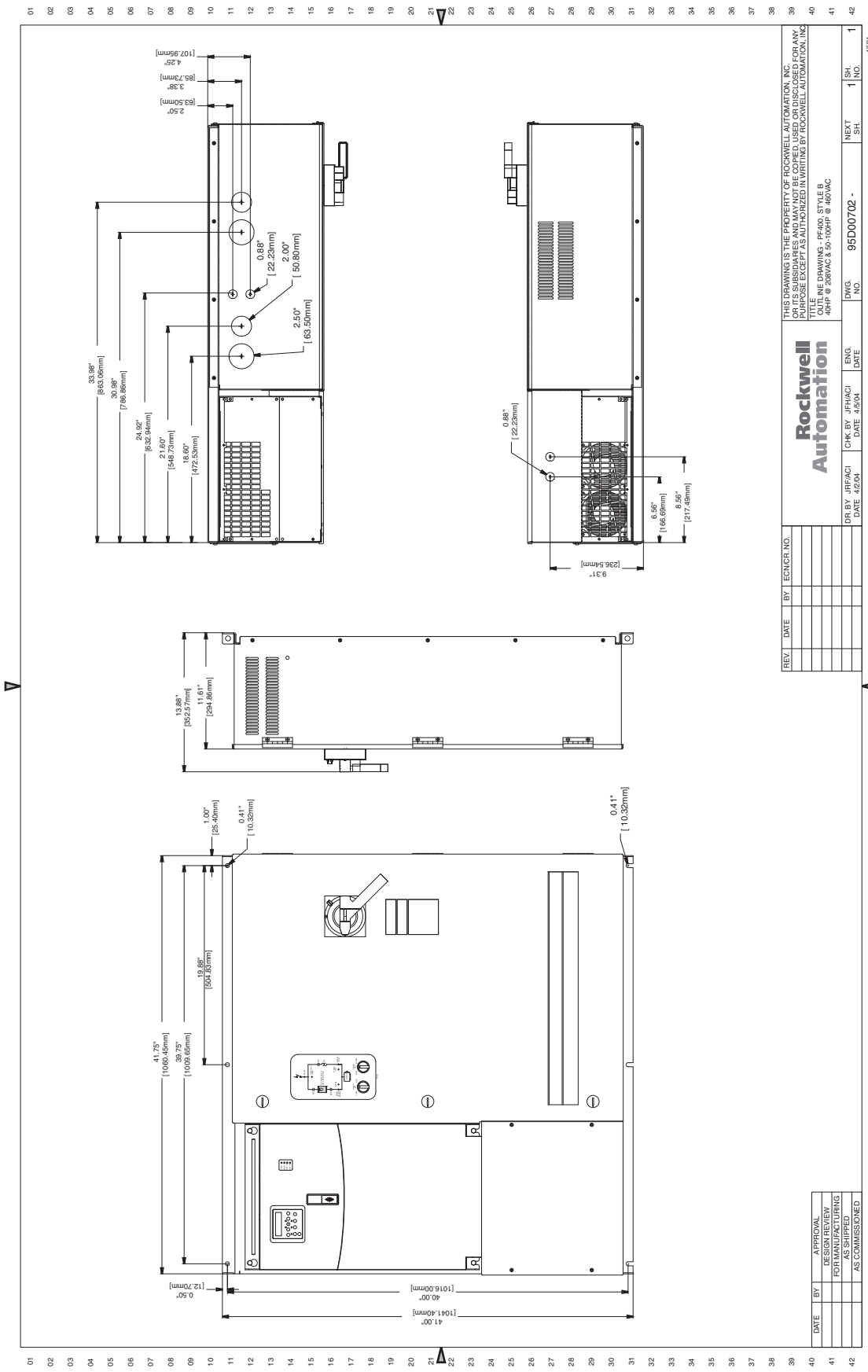


**Figure 2.64 50 Hp, 208V AC Drives - NEMA/UL Type 1**

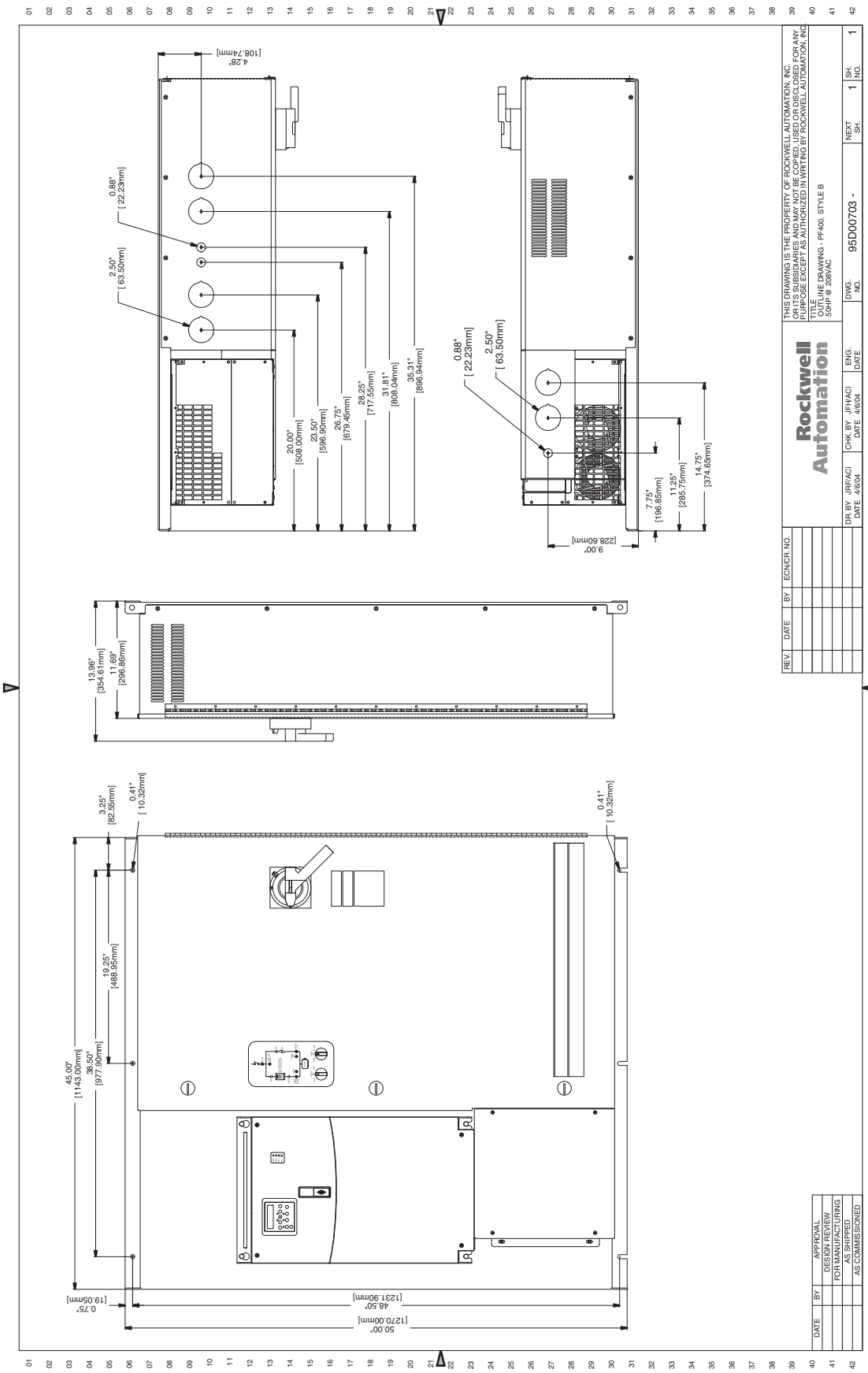


**Figure 2.65 125…150 Hp, 460V AC Drives - NEMA/UL Type 1**

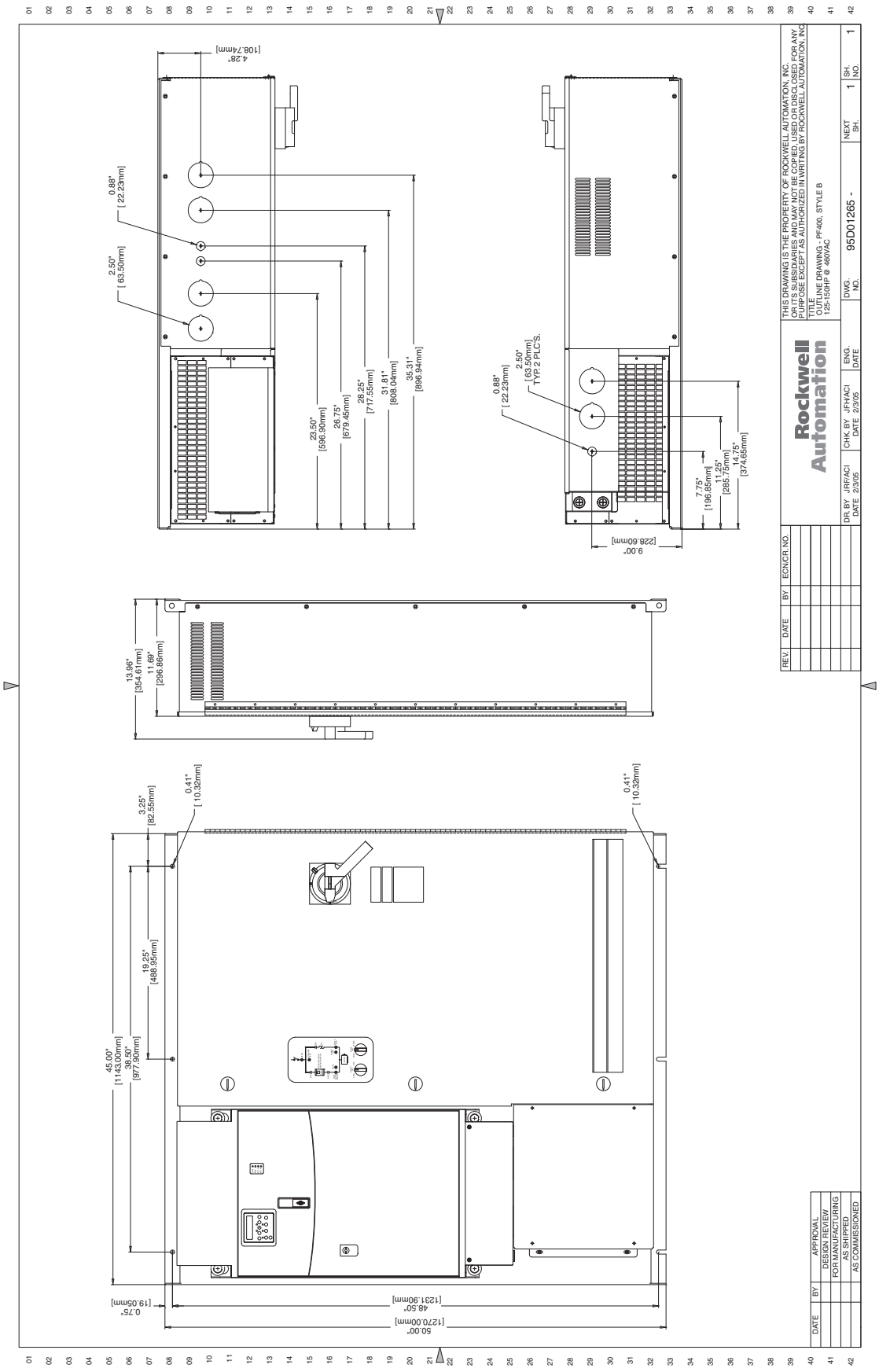


**Figure 2.66 200…250 Hp, 460V AC Drives - NEMA/UL Type 1**

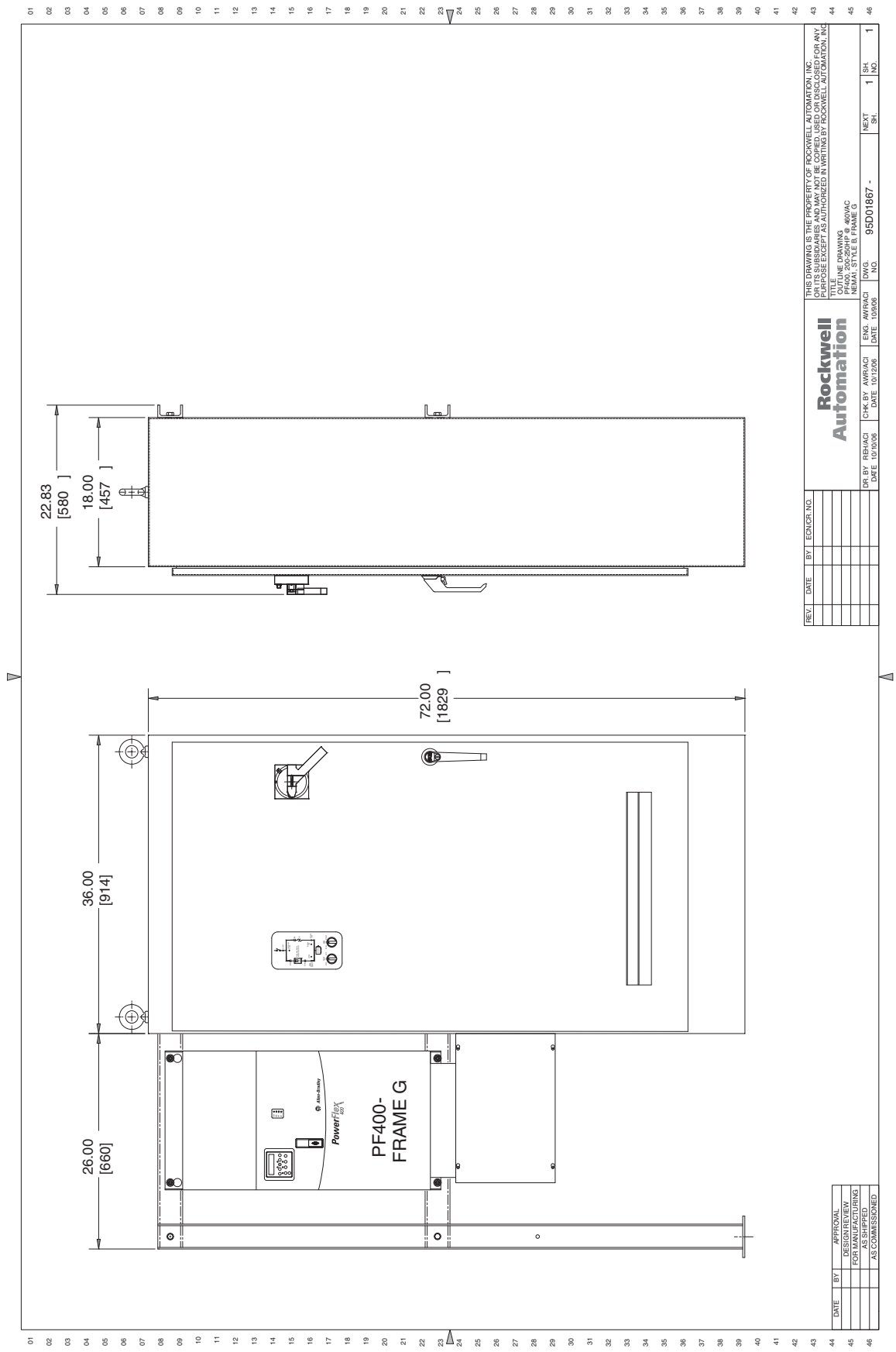


**Figure 2.67 300…350 Hp, 460V AC Drives - NEMA/UL Type 1**

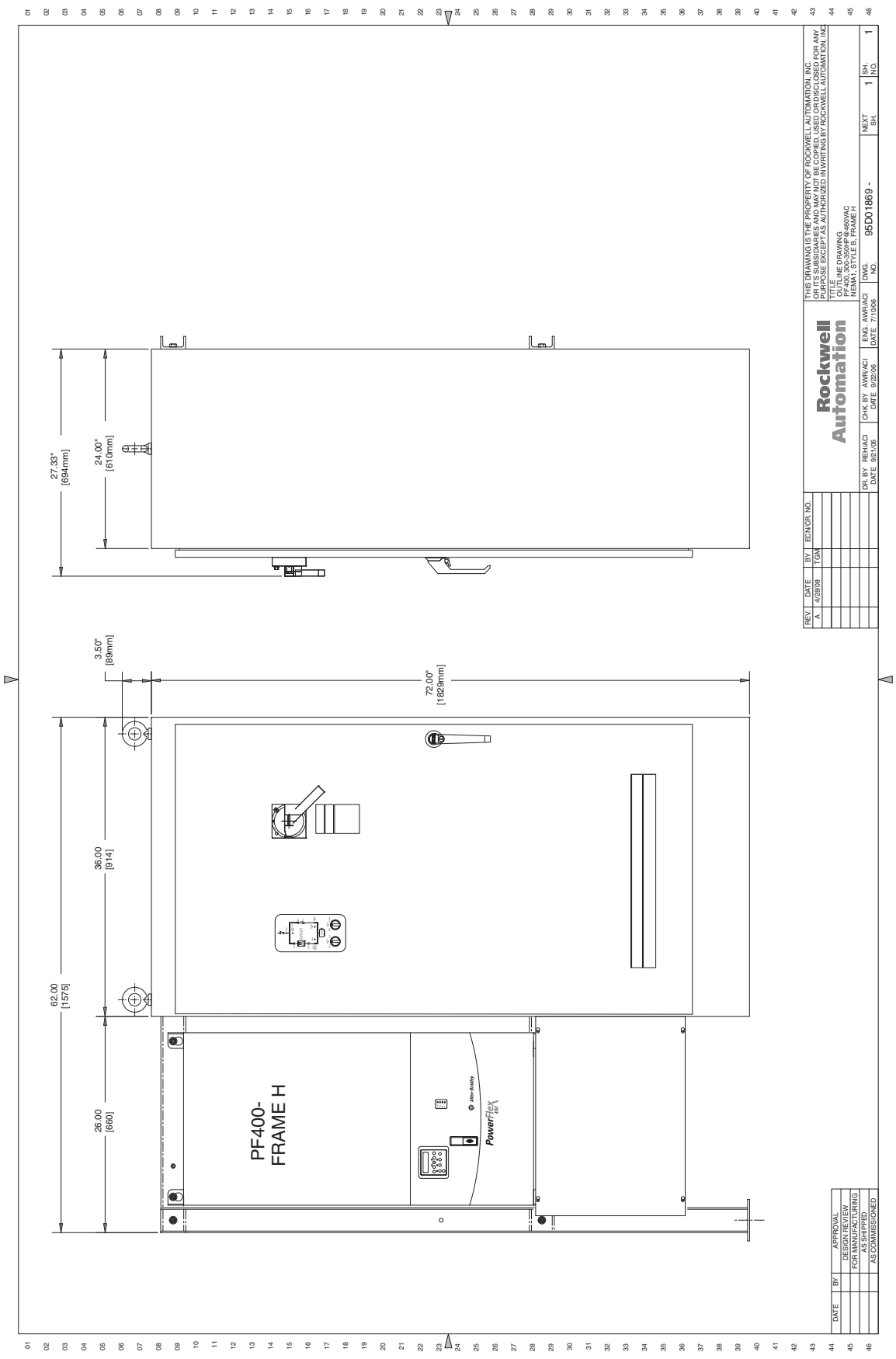


**Figure 2.68 3.0…5.0 Hp, 208V AC & 3.0…10 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1**

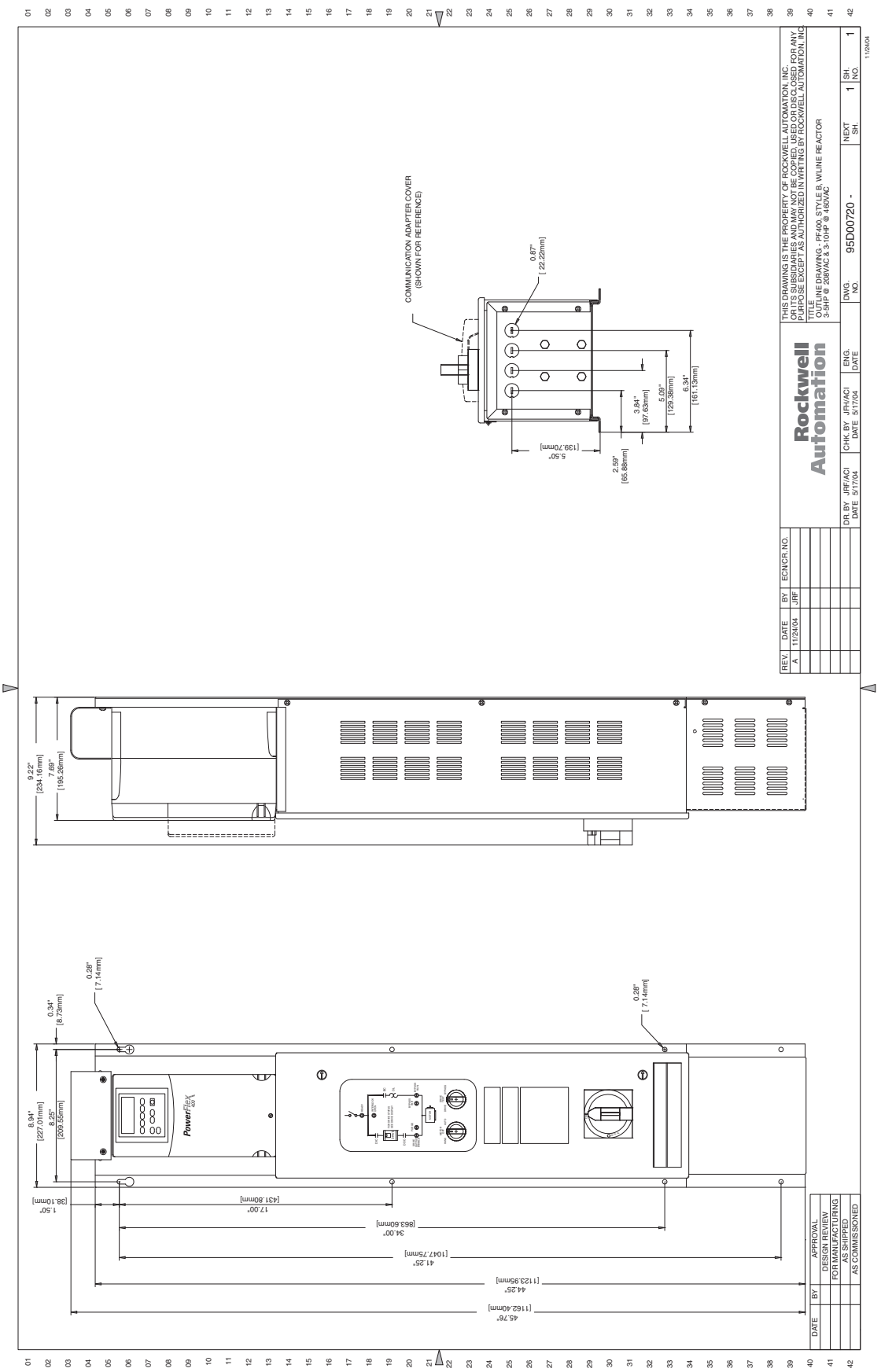


**Figure 2.69 7.5…10 Hp, 208V AC & 15…20 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1**

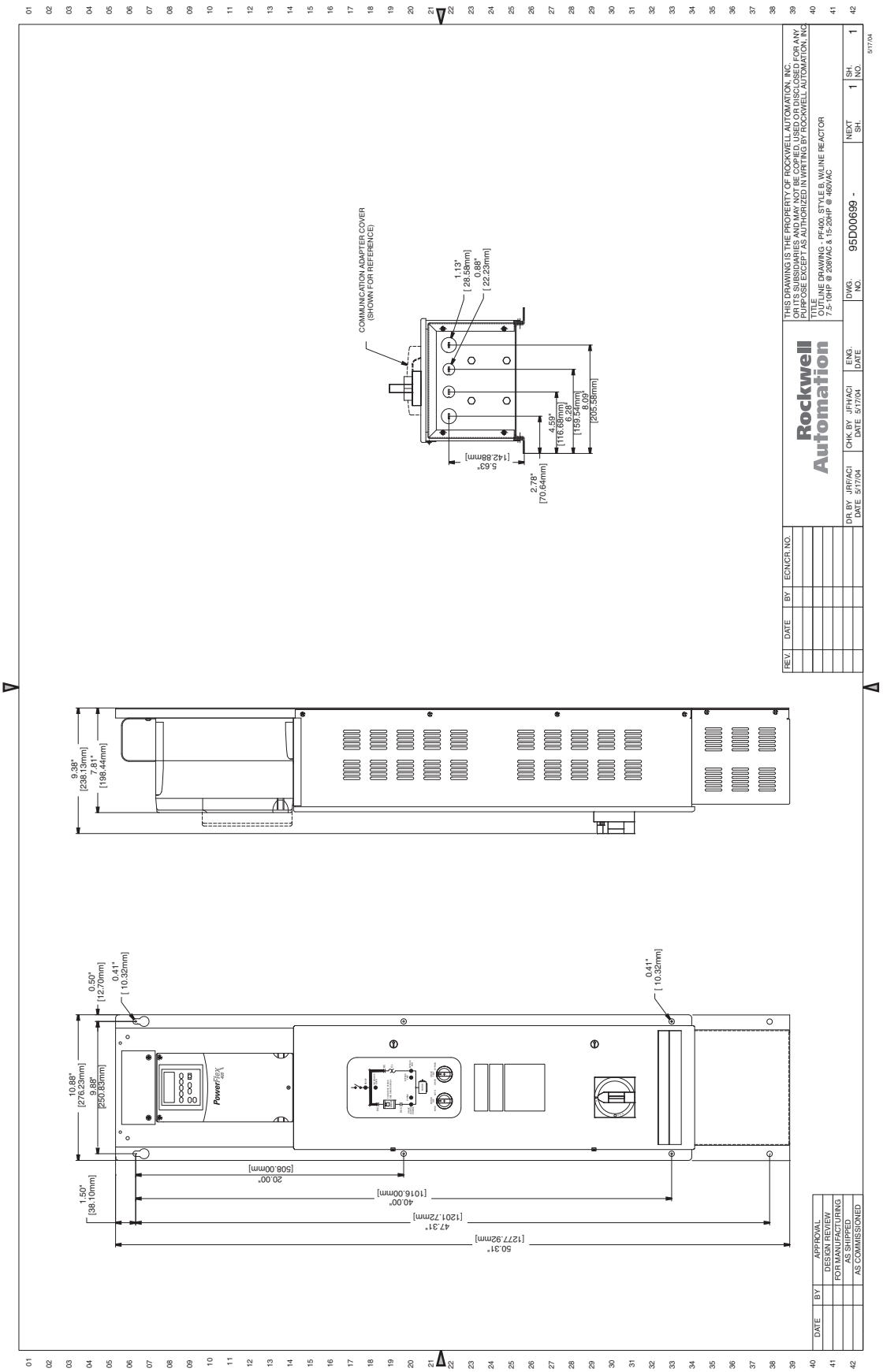


**Figure 2.70 15…20 Hp, 208V AC & 25…40 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1**

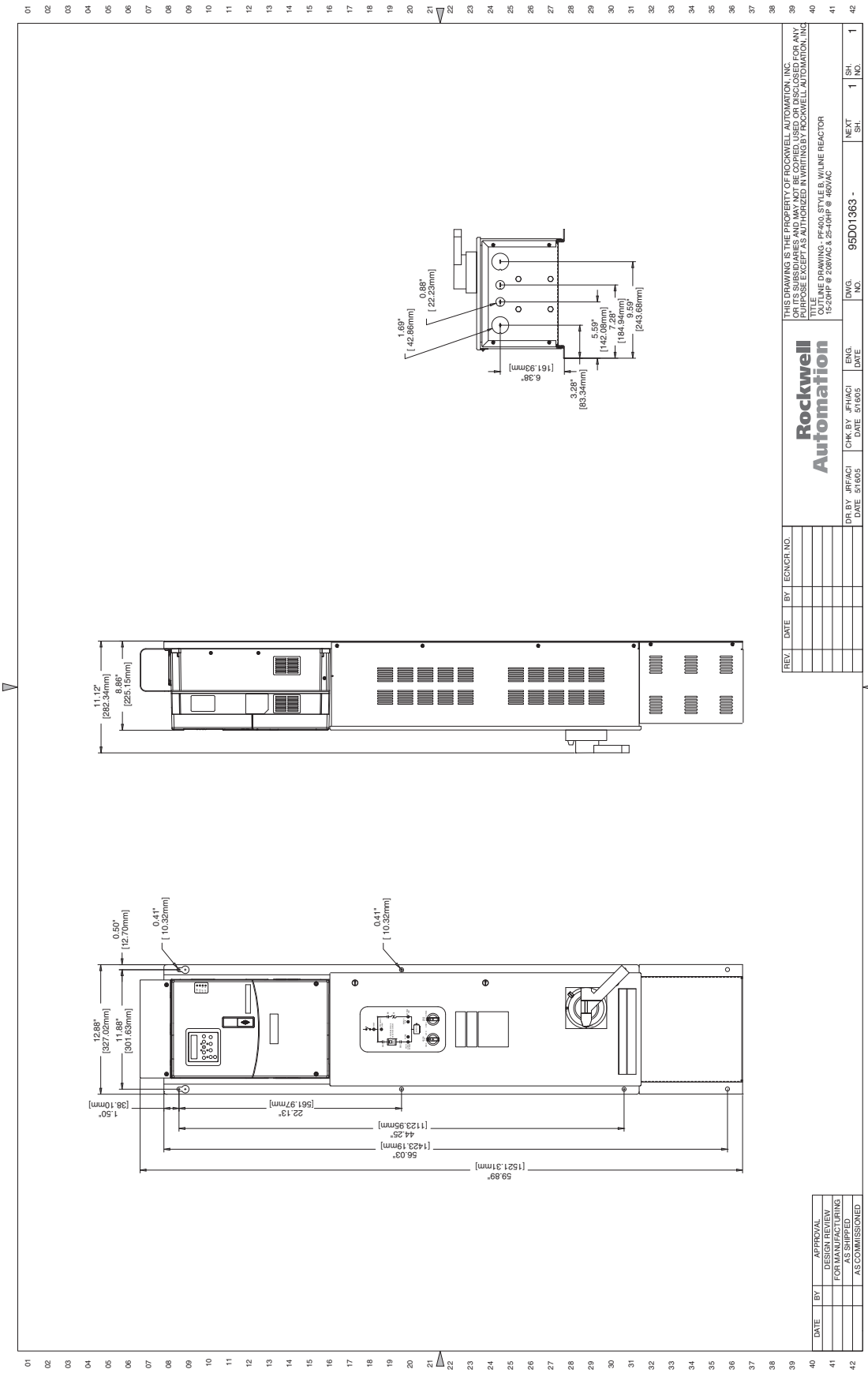
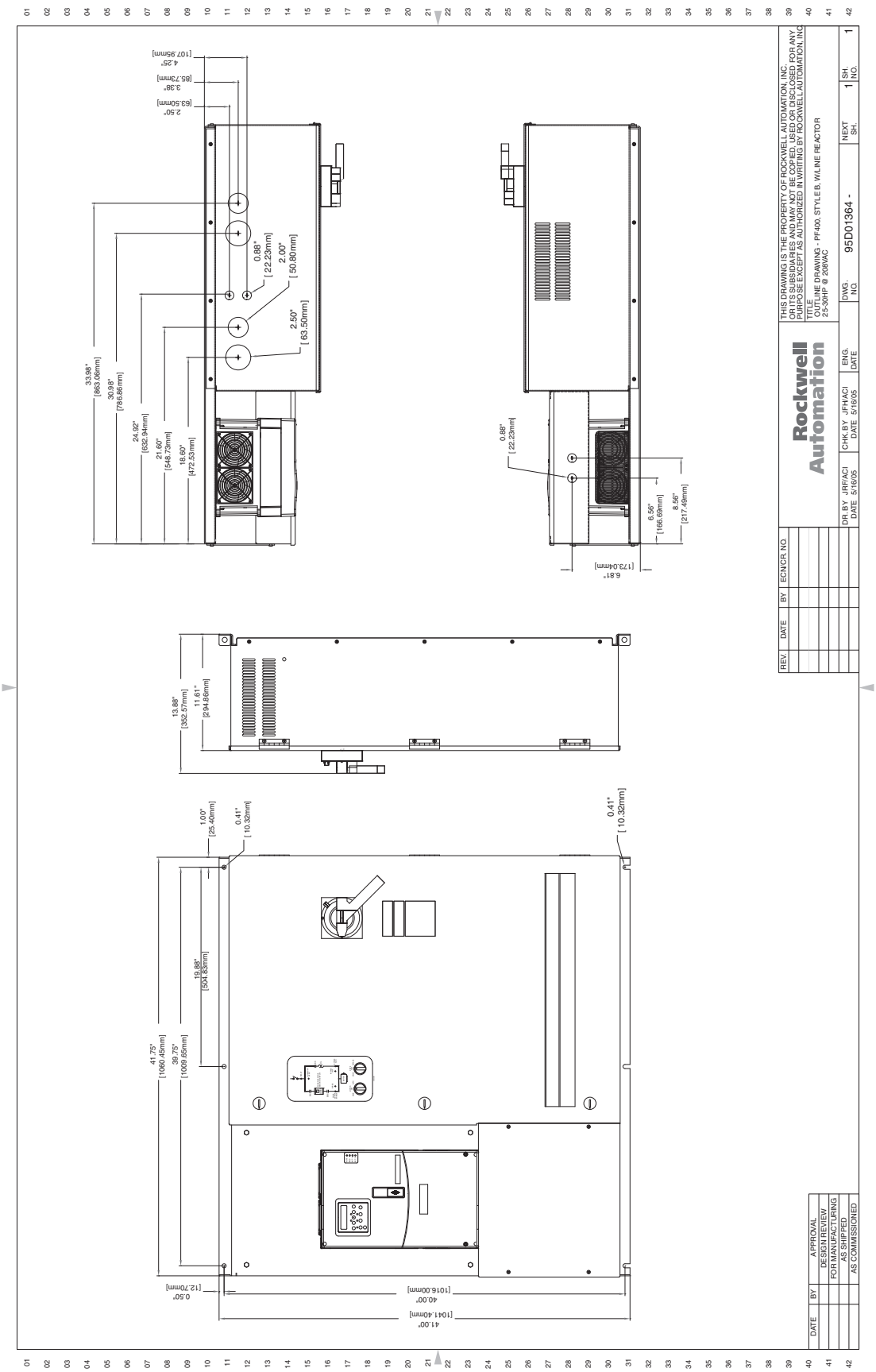


**Figure 2.71 25…30 Hp, 208V AC Drives with Line Reactor - NEMA/UL Type 1**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OUTLINE DRAWING - PF400, STYLE B, W/LINE REACTOR 25-30HP @ 208VAC
95D01364 -
APPROVAL
DESIGN REVIEW
FOR MANUFACTURING
AS SHIPPED
AS COMMISSIONED

**Figure 2.72 50...60 Hp, 460V AC Drives with Line Reactor - NEMAA/UL Type 1**

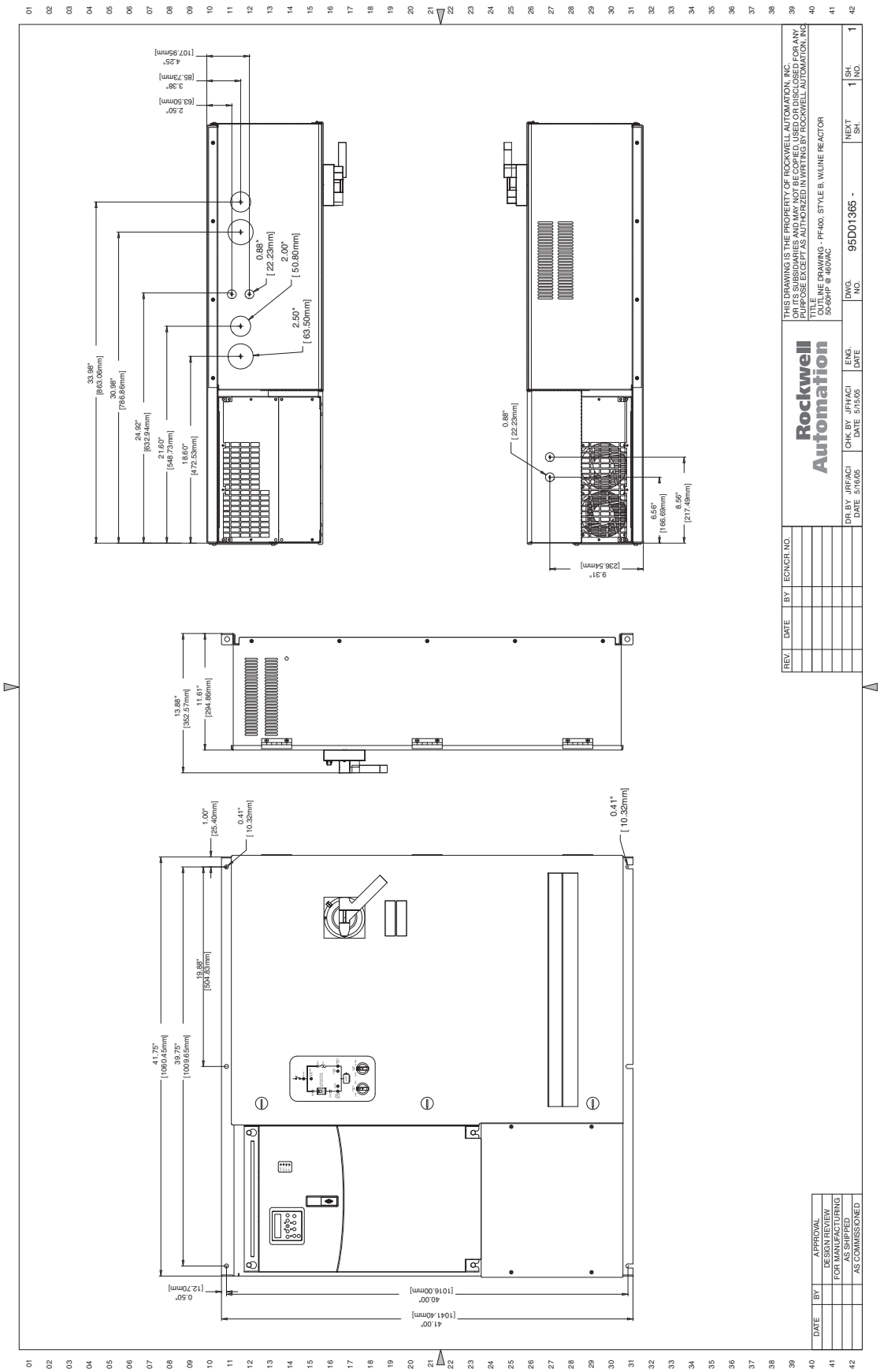


**Figure 2.73 40…50 Hp, 208V AC & 75…100 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1**

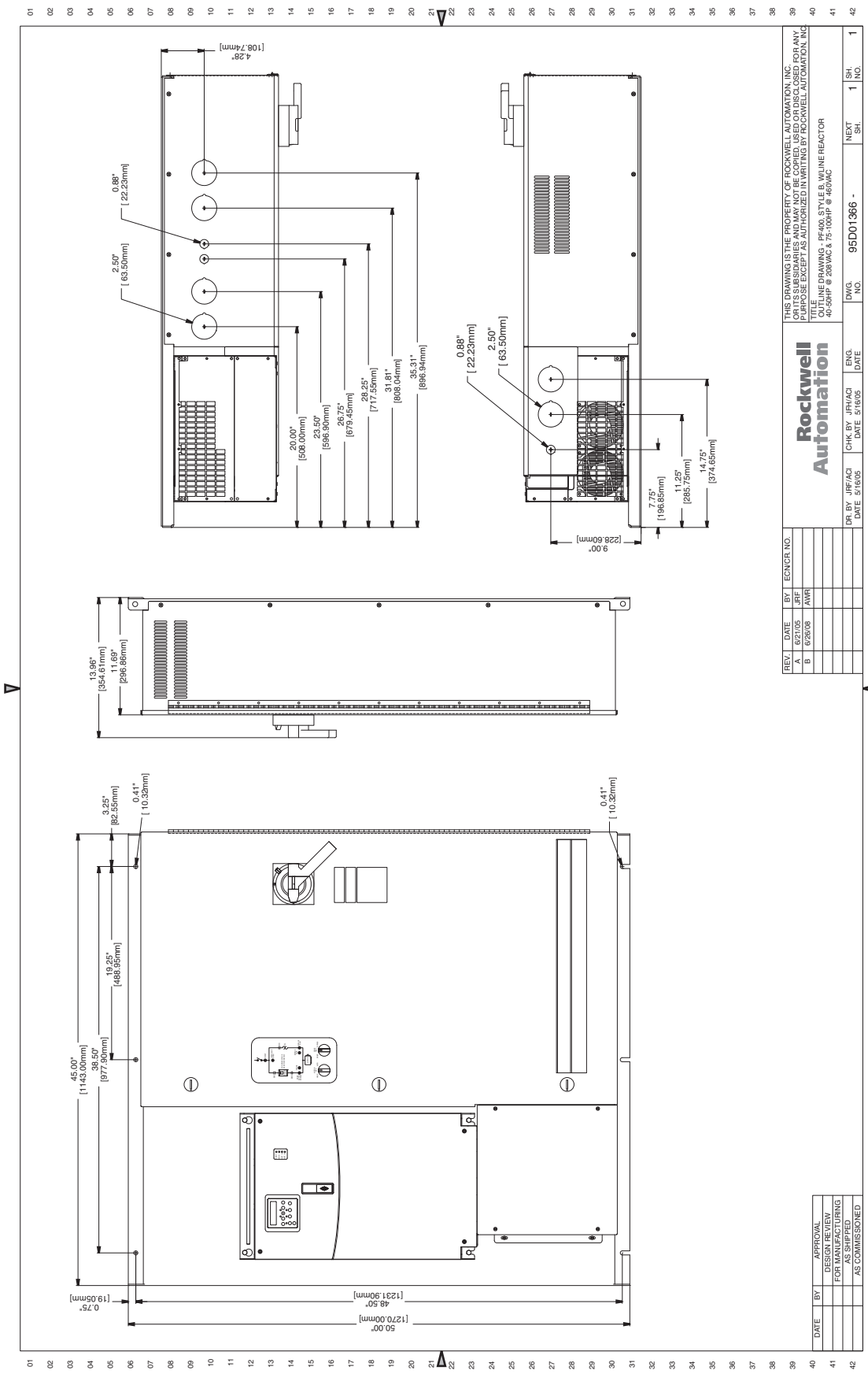
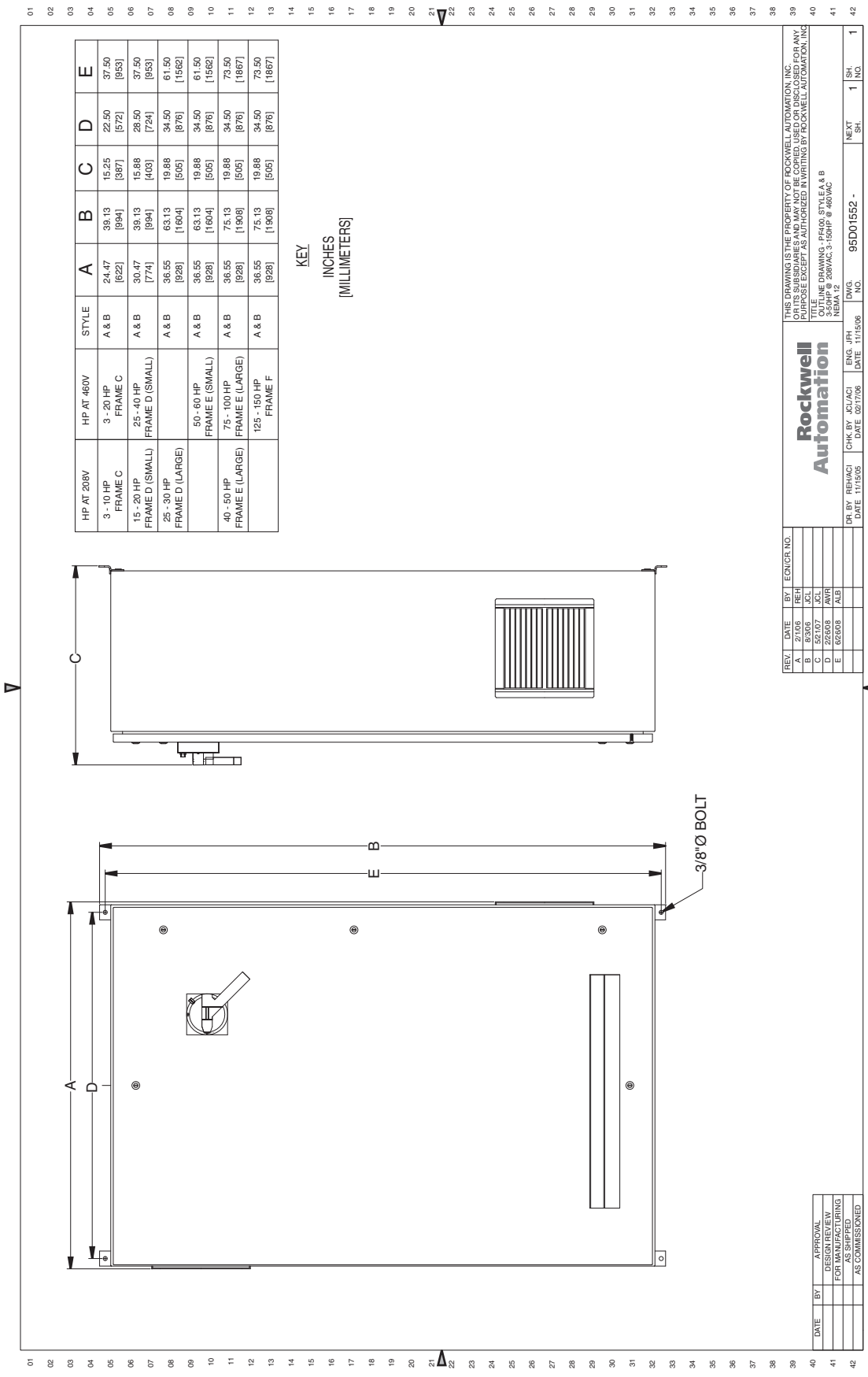


**Figure 2.74 3.0…50 Hp, 208V AC & 3.0…150 Hp, 460V AC Drives - NEMA/UL Type 12**




| HP AT 208V | HP AT 460V | STYLE | A | B | C | D | E |
|---|---|---|---|---|---|---|---|
| 3 - 10 HP FRAME C | 3 - 20 HP FRAME C | A & B | 24.47 [622] | 39.13 [994] | 15.25 [387] | 22.50 [572] | 37.50 [953] |
| 15 - 20 HP FRAME D (SMALL) | 25 - 40 HP FRAME D (SMALL) | A & B | 30.47 [774] | 39.13 [994] | 15.88 [403] | 28.50 [724] | 37.50 [953] |
| 25 - 30 HP FRAME D (LARGE) | | A & B | 36.55 [928] | 63.13 [1604] | 19.88 [505] | 34.50 [876] | 61.50 [1562] |
| | 50 - 60 HP FRAME E (SMALL) | A & B | 36.55 [928] | 63.13 [1604] | 19.88 [505] | 34.50 [876] | 61.50 [1562] |
| 40 - 50 HP FRAME E (LARGE) | 75 - 100 HP FRAME E (LARGE) | A & B | 36.55 [928] | 75.13 [1908] | 19.88 [505] | 34.50 [876] | 73.50 [1867] |
| | 125 - 150 HP FRAME F | A & B | 36.55 [928] | 75.13 [1908] | 19.88 [505] | 34.50 [876] | 73.50 [1867] |

**Figure 2.75 3.0…50 Hp, 208V AC & 3.0…150 Hp, 460V AC Drivess - NEMA/UL Type 4**

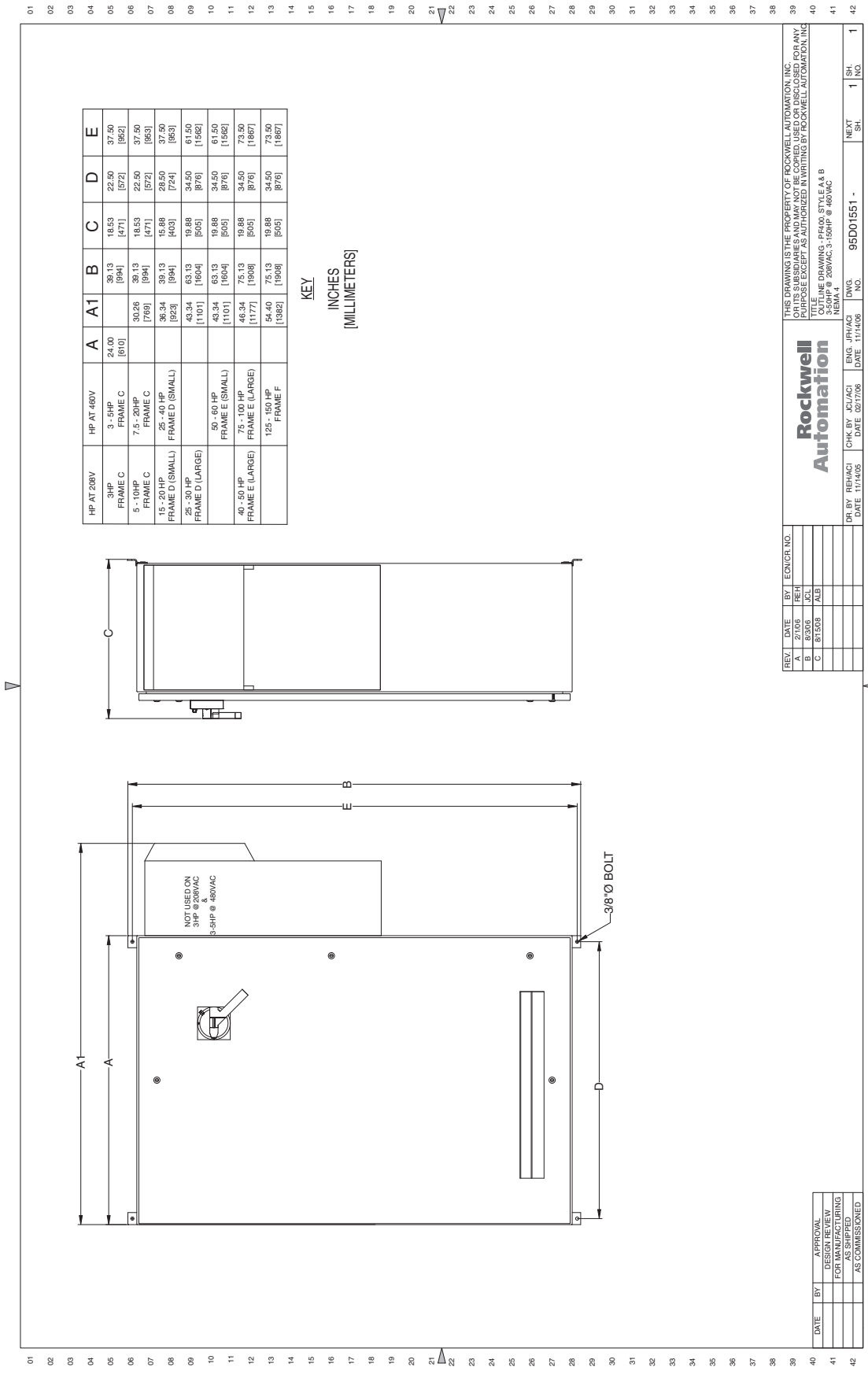
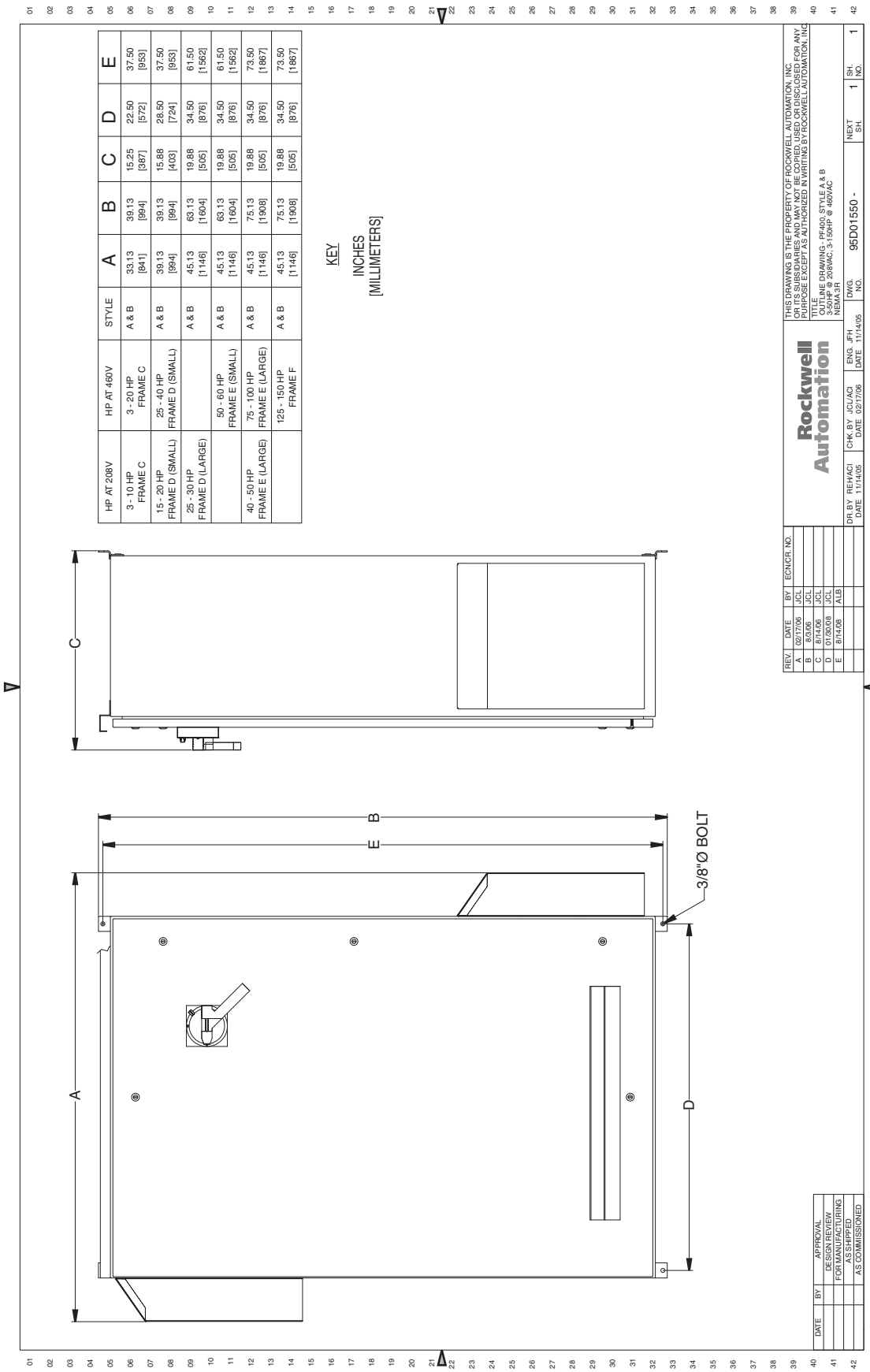


**Figure 2.76 3.0…50 Hp, 208V AC & 3.0…150 Hp, 460V AC Drivess - NEMA/UL Type 3R**




| HP AT 208V | HP AT 460V | STYLE | A | B | C | D | E |
|---|---|---|---|---|---|---|---|
| 3 - 10 HP FRAME C | 3 - 20 HP FRAME C | A & B | 33.13 [841] | 39.13 [994] | 15.25 [387] | 22.50 [572] | 37.50 [953] |
| 15 - 20 HP FRAME D (SMALL) | 25 - 40 HP FRAME D (SMALL) | A & B | 39.13 [994] | 39.13 [994] | 15.88 [403] | 28.50 [724] | 37.50 [953] |
| 25 - 30 HP FRAME D (LARGE) | | A & B | 45.13 [1146] | 63.13 [1604] | 19.88 [505] | 34.50 [876] | 61.50 [1562] |
| | 50 - 60 HP FRAME E (SMALL) | A & B | 45.13 [1146] | 63.13 [1604] | 19.88 [505] | 34.50 [876] | 61.50 [1562] |
| 40 - 50 HP FRAME E (LARGE) | 75 - 100 HP FRAME E (LARGE) | A & B | 45.13 [1146] | 75.13 [1908] | 19.88 [505] | 34.50 [876] | 73.50 [1867] |
| | 125 - 150 HP FRAME F | A & B | 45.13 [1146] | 75.13 [1908] | 19.88 [505] | 34.50 [876] | 73.50 [1867] |

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# 3 Contactor Basic Bypass with Disconnect Package (Style C)

## Chapter Objectives

This chapter describes the features and operation for the 3 Contactor Basic Bypass with Disconnect Package (Style C).


| For information on ... | See page ... |
|---|---|
| Hardware Overview | 3-1 |
| Electrical Installation | 3-4 |
| Operating Modes | 3-7 |
| Parameter Defaults | 3-8 |
| Drawing Index | 3-9 |
| Schematic Drawings | 3-10 |
| Interconnect Drawings | 3-13 |
| Layout Drawings | 3-16 |
| Outline Drawings | 3-20 |


## Hardware Overview

The 3 Contactor Basic Bypass with Disconnect Package (Style C) allows the motor be manually transferred from the drive output to the AC line, or from the AC line to the drive. Remote or automatic bypass operation is not provided with this option. A single door-mounted 4-position selector switch determines the state of operation. Additionally, a user-powered “Drive/ Bypass” enable relay is provided for remote shut down of the unit.

### Main Disconnect Switch (DS1 or MP1)

Allen-Bradley Bulletin 140M Motor Protectors are provided for all ratings through 60 Hp. The Bulletin 140M provides short circuit and overload protection. A lockable door-mounted operator handle is provided. The door-mounted handle accepts up to three (3) padlocks.

For ratings 75 Hp and larger, an Allen-Bradley Bulletin 194R fused disconnect switch with lockable rotary-mounted operator handle is provided. The disconnect switch is designed to meet disconnect switch requirements for branch circuit protection. The door-mounted handle accepts up to three (3) padlocks.

## Main Fuses (FU1-FU3)

**ATTENTION:** Most codes require that upstream branch circuit protection be provided to protect input power wiring. Install the fuses recommended in Table 3.A. Do not exceed the fuse ratings. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

For ratings 55 kW (75 Hp) and larger, input line branch circuit protection fuses must be used to protect the input power lines. If input fuses are not provided with your drive, recommended fuse values are shown in Table 3.A. The input fuse ratings listed in Table 3.A are applicable for one drive per branch circuit. No other load may be applied to that fused circuit.

The recommended fuse type for all PowerFlex Drives for Fan and Pump Applications is UL Class J, 600V.

**Table 3.A Fuse Recommendations**

| Drive Rating | | | Fuse Rating |
|---|---|---|---|
| **Input Voltage** | **kW** | **Hp** | **Amps** |
| 460V AC – 3-Phase | 55 | 75 | 175 |
| | 75 | 100 | 200 |

## Contactors (DIC, DOC, BC)

Allen-Bradley Bulletin 100 Contactors are provided for all ratings. The contactors function as follows:

- Drive Input Contactor (DIC) opens and closes input to the drive.
- Drive Output Contactor (DOC) opens and closes the connection between the drive and the motor.
- Bypass Contactor (BC) opens and closes the connection to the line-start the motor.

## Motor Overload Relay (OL)

For units supplied with a fused disconnect switch, a motor overload relay is supplied. The motor overload relay is set at the factory to 100% of the drive output current. In many cases, this setting matches the motor full load amps (FLA). However, before starting the drive, you should check the setting on the motor overload relay to assure that it is set properly for your motor.

- For motors with a service factor less than 1.15, set the motor overload relays to 0.9x motor FLA.
- For motors with a service factor equal to, or greater than 1.15, set the motor overload relay to the motor FLA.

**Figure 3.1 Setting Motor Overload**

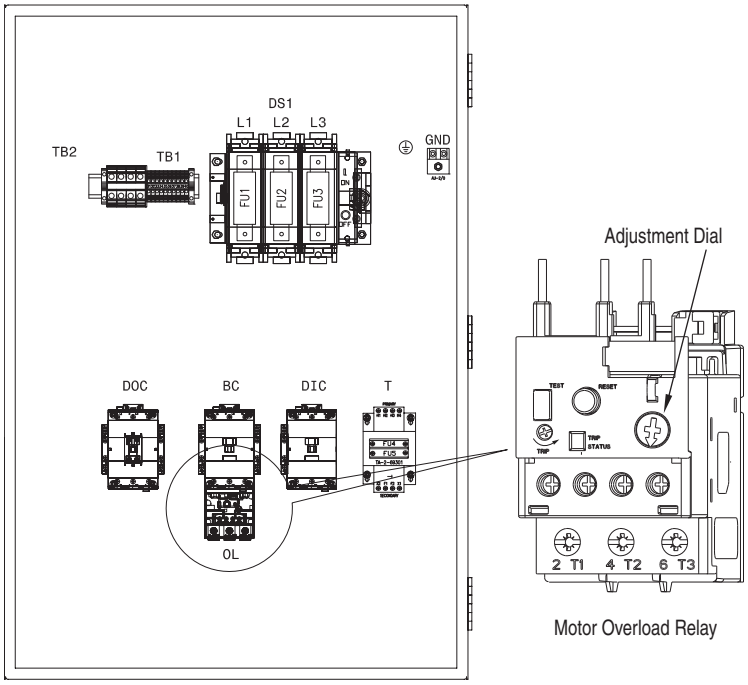



**Table 3.B Overload Ratings**

| Drive Rating | | | Overload Rating | |
|---|---|---|---|---|
| **Input Voltage** | **kW** | **Hp** | **Trip Class** | **Adjustment Rating (Amps)** |
| 460V AC – 3-Phase | 2.2 | 3.0 | 20 | 3.2 - 16 |
| | 4.0 | 5.0 | 20 | 3.2 - 16 |
| | 5.5 | 7.5 | 20 | 3.2 - 16 |
| | 7.5 | 10 | 20 | 5.4 - 27 |
| | 11 | 15 | 20 | 9 - 45 |
| | 15 | 20 | 20 | 9 - 45 |
| | 18.5 | 25 | 20 | 9 - 45 |
| | 22 | 30 | 20 | 9 - 45 |
| | 30 | 40 | 20 | 18 - 90 |
| | 37 | 50 | 20 | 18 - 90 |
| | 45 | 60 | 20 | 18 - 90 |
| | 55 | 75 | 20 | 40 - 200 |
| | 75 | 100 | 20 | 40 - 200 |

### Drive/Bypass Relay (CR)

A user-powered (24V AC) “Drive/Bypass” enable relay is provided for remote shut down of the unit. This relay can be used to turn off the motor whether the selector switch is in Drive or Bypass positions. It can also be used for an safety-input interlocks (freeze/fire stats, smoke purge, etc.). To utilize this function, factory-installed jumpers must be removed and Normally Closed contacts must be field wired to the appropriate input terminals.

## Electrical Installation

### Input Power Wiring

Use 75 °C rated copper conductors only for customer power wiring.

Refer to the PowerFlex 400 User Manual for additional detailed information about input power wiring recommendations and selection.

**ATTENTION:** Protect the contents of the options cabinet from metal chips and other debris while drilling the conduit openings. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

**ATTENTION:** Do not route signal and control wiring with power wiring in the same conduit. This can cause interference with drive operation. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

To connect AC input power to the drive package:

❏ **1.** Select the proper wire size according to NEC and all applicable local codes and standards. Note that you must punch openings in the Option Cabinet of the desired conduit size, following NEC and all applicable local codes and standards. Power terminal block specifications are listed in Table 3.C.

❏ **2.** Connect the three-phase AC input power leads (three-wire VAC) to the appropriate terminals. For ratings provided with a Motor Protector, connect the AC input power leads to terminals L1, L2, L3 on the Input Power Terminal Block. For ratings provided with a fused disconnect, connect the AC input power leads to terminals L1, L2, L3 on the fused disconnect switch.

❏ **3.** Tighten the AC input terminal power terminals to the proper torque according to drive type as shown in Table 3.C.

**Table 3.C AC Input Power Terminal Block Specification**

| Voltage Rating | kW | Hp | Maximum Wire Size[1] | Minimum Wire Size | Recommended Torque |
|---|---|---|---|---|---|
| 460V AC | 2.2…5.5 | 3.0…7.5 | 8.4 mm$^2$ (8 AWG) | 0.5 mm$^2$ (22 AWG) | 1.5 N•m (13 lb•in) |
| | 7.5…22 | 10…30 | 16.0 mm$^2$ (4 AWG) | 2.5 mm$^2$ (14 AWG) | 2.3 N•m (20 lb•in) |
| | 30 | 40 | 35.0 mm$^2$ (1/0 AWG) | 2.5 mm$^2$ (14 AWG) | 2.5 N•m (22 lb•in) |
| | 37…45 | 50…60 | 33.6 mm$^2$ (2 AWG) | 3.5 mm$^2$ (12 AWG) | 13.6 N•m (120 lb•in) |
| | 55…75 | 75…100 | 250 MCM | 10.0 mm$^2$ (6 AWG) | 31.1 N•m (275 lb•in) |

(1) Maximum/minimum sizes that the terminal block will accept - these are not recommendations. If national or local codes require sizes outside the range, lugs may be used.

## Output Power Wiring

Refer to the PowerFlex 400 User Manual for additional detailed information about output power wiring recommendations and selection.

**ATTENTION:** Unused wires in conduit must be grounded at both ends to avoid a possible shock hazard caused by induced voltages. Also, if a drive sharing a conduit is being serviced or installed, all drives using this conduit should be disabled to eliminate the possible shock hazard from cross-coupled motor leads. Failure to observe these precautions could result in bodily injury.

**ATTENTION:** Do not route signal and control wiring with power wiring in the same conduit. This can cause interference with drive operation. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

To connect AC output power wiring from the drive to the motor:

❑ **1.** Wire the three-phase AC output power motor leads by routing them according to the drive option type. Note that you must punch openings in the option cabinet of the desired conduit size, following NEC and all applicable local codes and standards. Output power terminal block specifications are listed in Table 3.D.

Do not route more than three sets of motor leads through a single conduit. This will minimize cross-talk that could reduce the effectiveness of noise reduction methods. If more than three drive/motor connections per conduit are required, shielded cable must be used. If possible, each conduit should contain only one set of motor leads.

❑ **2.** Connect the three-phase AC output power motor leads to terminals T1, T2, T3 on the output power terminal block located inside the Option Cabinet.

❑ **3.** Tighten the three-phase AC output power terminals to the proper torque according to drive type as shown in Table 3.D.

**Table 3.D Output Power Terminal Block Specification**

| Voltage Rating | kW | Hp | Maximum Wire Size[1] | Minimum Wire Size | Recommended Torque |
|---|---|---|---|---|---|
| 460V AC | 2.2…5.5 | 3.0…7.5 | 8.4 $mm^2$ (8 AWG) | 0.5 $mm^2$ (22 AWG) | 1.5 N•m (13 lb•in) |
| | 7.5…22 | 10…30 | 16.0 $mm^2$ (4 AWG) | 2.5 $mm^2$ (14 AWG) | 2.3 N•m (20 lb•in) |
| | 30…55 | 40…75 | 35.0 $mm^2$ (1/0 AWG) | 2.5 $mm^2$ (14 AWG) | 2.5 N•m (22 lb•in) |
| | 75 | 100 | 350 MCM | 10.0 $mm^2$ (6 AWG) | 31.1 N•m (275 lb•in) |

(1) Maximum/minimum sizes that the terminal block will accept - these are not recommendations. If national or local codes require sizes outside the range, lugs may be used.

## Control and Signal Wiring

Refer to the PowerFlex 400 User Manual for additional detailed information about control and signal wiring.

The Signal Terminal Block (TB1 Terminals 1…20 and R1…R6) located on the drive Main Control Board and Control Terminal Block (TB1 Terminals 19…24) located inside the Option Cabinet provide terminals for interfacing customer supplied control inputs and outputs. All analog and discrete control wiring will be made at these terminals. Typical customer control and signal wiring is shown on the Interconnect drawings, Figure 3.5, Figure 3.6 and Figure 3.7.

To connect control and signal wiring to the drive package:

❑ **1.** Wire the control and signal leads by routing them according to the drive option type. Note that you must punch openings in the option cabinet of the desired conduit size, following NEC and all applicable local codes and standards. Control and signal terminal block specifications are listed in Table 3.E.

Control and signal wires should be separated from power wires by at least 0.3 meters (1 foot).

❑ **2.** Connect the analog and relay output signal wiring to terminals 1…20 and R1…R6 located on the drive Main Control Board.

❑ **3.** Connect the control wiring listed below to terminals 19…24 located inside the Option Cabinet.
- Drive Start/Stop
- Drive/Bypass Enable
- Bypass Run

❑ **4.** Tighten the I/O terminals to the proper torque according to drive type as shown in Table 3.E.

**Table 3.E Control and Signal Terminal Block Specifications**

| Voltage Rating | Terminals | Location | Maximum Wire Size[1] | Minimum Wire Size | Torque |
|---|---|---|---|---|---|
| 460V AC | 1...20, R1...R6 | Main Control Board | 1.3 $mm^2$ (16 AWG) | 0.13 $mm^2$ (26 AWG) | 0.5…0.8 N•m (4.4…7 lb•in) |
| | 19…24 | Option Cabinet | 4.0 $mm^2$ (10 AWG) | 0.5 $mm^2$ (22 AWG) | 0.6 N•m (5.0 lb•in) |

(1) Maximum/minimum sizes that the terminal block will accept - these are not recommendations.

## Operating Modes

### Drive Mode

For this mode to be active, the door-mounted selector switch needs to be in the DRIVE position. The DIC and DOC are energized and the BC is de-energized.

When the drive is in HAND configuration, the start command comes from the integral keypad Start/Hand key. The speed reference come from the Digital Increment and Decrement keys.

When the drive is in AUTO configuration, the start command is set for two-wire control. The drive runs when there is a closed contact between terminals 19-20 located inside the Option Cabinet and stops when the contact is open. Parameter P038 [Speed Reference] determines the source of the speed reference. The drive package ships with the speed reference configured for Analog In1 which would be wired to signal terminals 13-14 located on the drive. Refer to the PowerFlex 400 User manual for information on other control schemes.

### Test Mode

For this mode to be active, the door-mounted selector switch needs to be in the “Test” position. The DIC is energized and the DOC and BC are de-energized.

### Off Mode

For this mode to be active, the door-mounted selector switch needs to be in the “Off” position. The DIC, DOC and BC are all de-energized. The PowerFlex drive will not be powered and the motor will not run.

### Bypass Mode

In the Bypass Mode the BC is energized and the DIC and DOC are de-energized. The motor is powered by the AC line. The motor will immediately be powered when the selector switch is in the “Bypass” position unless the “Drive/Bypass Enable” relay, CR, is used and is not picked up.

# Parameter Defaults
## 3 Contactor Basic Bypass with Disconnect Package (Style C)

| Parameter Name | Number | Default |
|---|---|---|
| Output Freq | b001 | Read Only |
| Commanded Freq | b002 | Read Only |
| Output Current | b003 | Read Only |
| Output Voltage | b004 | Read Only |
| DC Bus Voltage | b005 | Read Only |
| Drive Status | b006 | Read Only |
| Fault 1 Code | b007 | Read Only |
| Process Display | b008 | Read Only |
| Output Power | b010 | Read Only |
| Elapsed MWh | b011 | Read Only |
| Elapsed Run Time | b012 | Read Only |
| Torque Current | b013 | Read Only |
| Drive Temp | b014 | Read Only |
| Elapsed kWh | b015 | Read Only |
| | | |
| Motor NP Volts | P031 | Drive Rated Volts |
| Motor NP Hertz | P032 | 60 Hz |
| Motor OL Current | P033 | Drive Rated Amps |
| Minimum Freq | P034 | 0.0 Hz |
| Maximum Freq | P035 | 60 Hz |
| Start Source | P036 | 6 "2-W Lvl/Enbl"(1) |
| Stop Mode | P037 | 1 "Coast, CF" |
| Speed Reference | P038 | 2 "Analog In1" |
| Accel Time 1 | P039 | 20.00 Secs |
| Decel Time 1 | P040 | 20.00 Secs |
| Reset To Defalts | P041 | 0 "Ready/Idle" |
| Auto Mode | P042 | 1 "Hnd-Off-Auto" |
| | | |
| Digital In1 Sel | T051 | 1 "Purge" |
| Digital In2 Sel | T052 | 3 "Local" |
| Digital In3 Sel | T053 | 10 "Clear Fault" |
| Digital In4 Sel | T054 | 4 "Comm Port" |
| Relay Out1 Sel | T055 | 0 "Ready/Fault" |
| Relay Out1 Level | T056 | 0.0 |
| Relay 1 On Time | T058 | 0.0 Secs |
| Relay 1 Off Time | T059 | 0.0 Secs |
| Relay Out2 Sel | T060 | 2 "MotorRunning" |
| Relay Out2 Level | T061 | 0.0 |
| Relay 2 On Time | T063 | 0.0 Secs |
| Relay 2 Off Time | T064 | 0.0 Secs |
| Opto Out Sel | T065 | 1 "At Frequency" |
| Opto Out Level | T066 | 0.0 |
| Opto Out Logic | T068 | 0 "Normally Open" |
| Analog In 1 Sel | T069 | 2 "0-10V" |
| Analog In 1 Lo | T070 | 0.0% |
| Analog In 1 Hi | T071 | 100.0% |
| Analog In 1 Loss | T072 | 0 "Disabled" |
| Analog In 2 Sel | T073 | 1 "4-20 mA"(1) |
| Analog In 2 Lo | T074 | 0.0% |
| Analog In 2 Hi | T075 | 100.0% |
| Analog In 2 Loss | T076 | 0 "Disabled" |
| Sleep-Wake Sel | T077 | 0 "Disabled" |
| Sleep Level | T078 | 10.0% |
| Sleep Time | T079 | 0.0 Secs |
| Wake Level | T080 | 15.0% |
| Wake Time | T081 | 0.0 Secs |
| Analog Out1 Sel | T082 | 0 "OutFreq 0-10" |
| Analog Out1 High | T083 | 100% |
| Analog Out1 Setpt | T084 | 0.0% |
| Analog Out2 Sel | T085 | 1 "OutCurr 0-10" |
| Analog Out2 High | T086 | 100% |
| Analog Out2 Setpt | T087 | 0.0% |
| | | |
| Language | C101 | 1 "English" |
| Comm Format | C102 | 0 "RTU 8-N-1" |
| Comm Data Rate | C103 | 3 "9600" |
| Comm Node Addr | C104 | 100 |
| Comm Loss Action | C105 | 0 "Fault" |
| Comm Loss Time | C106 | 5.0 Secs |
| Comm Write Mode | C107 | 0 "Save" |
| | | |
| Purge Frequency | A141 | 5.0 Hz |
| Internal Freq | A142 | 60.00 Hz |
| Preset Freq 0 | A143 | 0.0 Hz |
| Preset Freq 1 | A144 | 5.0 Hz |
| Preset Freq 2 | A145 | 10.0 Hz |
| Preset Freq 3 | A146 | 20.0 Hz |
| Accel Time 2 | A147 | 30.00 Secs |
| Decel Time 2 | A148 | 30.00 Secs |
| S Curve % | A149 | 20% |
| PID Trim Hi | A150 | 60.0 Hz |
| PID Trim Lo | A151 | 0.0 Hz |
| PID Ref Sel | A152 | 0 "PID Disabled" |
| PID Feedback Sel | A153 | 0 "Analog In 1" |
| PID Prop Gain | A154 | 0.01 |
| PID Integ Time | A155 | 2.0 Secs |
| PID Diff Rate | A156 | 0.00 |
| PID Setpoint | A157 | 0.0% |
| PID Deadband | A158 | 0.0% |
| PID Preload | A159 | 0.0 Hz |
| Process Factor | A160 | 30.0 |
| Auto Rstrt Tries | A163 | 0 |
| Auto Rstrt Delay | A164 | 1.0 Secs |
| Start At PowerUp | A165 | 1 "Enabled"(1) |
| Reverse Disable | A166 | 1 "Rev Disabled" |
| Flying Start En | A167 | 1 "Enabled"(1) |
| PWM Frequency | A168 | 4.0 kHz |
| PWM Mode | A169 | 1 "2-Phase" |
| Boost Select | A170 | 4 "45.0, VT" |
| Start Boost | A171 | 2.5% |
| Break Voltage | A172 | 25.0% |
| Break Frequency | A173 | 15.0 Hz |
| Maximum Voltage | A174 | Drive Rated Volts |
| Slip Hertz @ FLA | A175 | 2.0 Hz |
| DC Brake Time | A176 | 0.0 Secs |
| DC Brake Level | A177 | Drive Rated Amps |
| DC Brk Time@Strt | A178 | 0 (Disabled) |
| Current Limit 1 | A179 | Drive Rated Amps |
| Current Limit 2 | A180 | Drive Rated Amps |
| Motor OL Select | A181 | 0 "No Derate" |
| Drive OL Mode | A182 | 3 "Both-PWM 1st" |
| SW Current Trip | A183 | 0.0 (Disabled) |
| Load Loss Level | A184 | 0.0 (Disabled) |
| Load Loss Time | A185 | 0 Secs |
| Stall Fault Time | A186 | 0 "60 Seconds" |
| Bus Reg Mode | A187 | 1 "Enabled" |
| Skip Frequency 1 | A188 | 0 Hz |
| Skip Freq Band 1 | A189 | 0.0 Hz |
| Skip Frequency 2 | A190 | 0 Hz |
| Skip Freq Band 2 | A191 | 0.0 Hz |
| Skip Frequency 3 | A192 | 0 Hz |
| Skip Freq Band 3 | A193 | 0.0 Hz |
| Compensation | A194 | 1 "Electrical" |
| Reset Meters | A195 | 0 "Ready/Idle" |
| Testpoint Sel | A196 | 400 |
| Fault Clear | A197 | 0 "Ready/Idle" |
| Program Lock | A198 | 0 "Unlocked" |
| Motor NP Poles | A199 | 4 |
| | | |
| Relay Out3 Sel | R221 | 0 "Ready/Fault" |
| Relay Out3 Level | R222 | 0.0 |
| Relay Out4 Sel | R224 | 0 "Ready/Fault" |
| Relay Out4 Level | R225 | 0.0 |
| Relay Out5 Sel | R227 | 0 "Ready/Fault" |
| Relay Out5 Level | R228 | 0.0 |
| Relay Out6 Sel | R230 | 0 "Ready/Fault" |
| Relay Out6 Level | R231 | 0.0 |
| Relay Out7 Sel | R233 | 0 "Ready/Fault" |
| Relay Out7 Level | R234 | 0.0 |
| Relay Out8 Sel | R236 | 0 "Ready/Fault" |
| Relay Out8 Level | R237 | 0.0 |
| Aux Motor Mode | R239 | 0 "Disabled" |
| Aux Motor Qty | R240 | 1 "1 Aux Mtr" |
| Aux 1 Start Freq | R241 | 50.0 Hz |
| Aux 1 Stop Freq | R242 | 25.0 Hz |
| Aux 1 Ref Add | R243 | 0.0% |
| Aux 2 Start Freq | R244 | 50.0 Hz |
| Aux 2 Stop Freq | R245 | 25.0 Hz |
| Aux 2 Ref Add | R246 | 0.0% |
| Aux 3 Start Freq | R247 | 50.0 Hz |
| Aux 3 Stop Freq | R248 | 25.0 Hz |
| Aux 3 Ref Add | R249 | 0.0% |
| Aux Start Delay | R250 | 5.0 Secs |
| Aux Stop Delay | R251 | 3.0 Secs |
| Aux Prog Delay | R252 | 0.50 Secs |
| Aux AutoSwap Tme | R253 | 0.0 Hr |
| Aux AutoSwap Lvl | R254 | 50.0% |
| | | |
| Control Source | d301 | Read Only |
| Contrl In Status | d302 | Read Only |
| Comm Status | d303 | Read Only |
| PID Setpnt Displ | d304 | Read Only |
| Analog In 1 | d305 | Read Only |
| Analog In 2 | d306 | Read Only |
| Fault 1 Code | d307 | Read Only |
| Fault 2 Code | d308 | Read Only |
| Fault 3 Code | d309 | Read Only |
| Fault 1 Time-hr | d310 | Read Only |
| Fault 1 Time-min | d311 | Read Only |
| Fault 2 Time-hr | d312 | Read Only |
| Fault 2 Time-min | d313 | Read Only |
| Fault 3 Time-hr | d314 | Read Only |
| Fault 3 Time-min | d315 | Read Only |
| Elapsed Time-hr | d316 | Read Only |
| Elapsed Time-min | d317 | Read Only |
| Output Powr Fctr | d318 | Read Only |
| Testpoint Data | d319 | Read Only |
| Control SW Ver | d320 | Read Only |
| Drive Type | d321 | Read Only |
| Output Speed | d322 | Read Only |
| Output RPM | d323 | Read Only |
| Fault Frequency | d324 | Read Only |
| Fault Current | d325 | Read Only |
| Fault Bus Volts | d326 | Read Only |
| Status @ Fault | d327 | Read Only |

(1) The default values of these parameters differ from Factory Defaults. Setting P041 [Reset To Defalts] to 1 "Factory Rset" will change these parameter settings to the defaults list in the PowerFlex 400 User Manual.

**ATTENTION:** Parameter A165 [Start At PowerUp] ships from the factory enabled. This feature allows a Run command to automatically cause the drive to resume running at commanded speed after drive input power is restored. Equipment damage and/or personal injury may result if this parameter is used in an inappropriate application. Do not use this function without considering applicable local, national and international codes, standards, regulations or industry guidelines.

## Drawing Index

## 460V AC – 3 Contactor Basic Bypass with Disconnect Package (Style C)

| Input Voltage | Type | Hp | Input Line Reactor | Drawing | | | | | | | | Hp |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Schematic | *Page* | Interconnect | *Page* | Layout | *Page* | Outline | *Page* | |
| 460V AC | NEMA/UL Type 1 | 3 | No | 98D00715 | 3-10 | 97D00711 | 3-13 | 95D00766 | 3-16 | 95D00706 | 3-20 | 3 |
| | | 5 | | | | | | | | | | 5 |
| | | 7.5 | | | | | | | | | | 7.5 |
| | | 10 | | | | | | | | | | 10 |
| | | 15 | | | | | | | | | | 15 |
| | | 20 | | | | | | | | | | 20 |
| | | 25 | | 98D00717 | 3-11 | | | 95D00767 | 3-17 | 95D00708 | 3-21 | 25 |
| | | 30 | | | | | | | | | | 30 |
| | | 40 | | | | | | | | | | 40 |
| | | 50 | | | | 97D00713 | 3-14 | 95D00768 | 3-18 | 95D00710 | 3-22 | 50 |
| | | 60 | | | | | | | | | | 60 |
| | | 75 | | 98D00718 | 3-12 | 97D00714 | 3-15 | 95D00769 | 3-19 | | | 75 |
| | | 100 | | | | | | | | | | 100 |

## Schematic Drawings

**Figure 3.2 3.0…20 Hp, 460V AC Drives NEMA/UL Type 1**

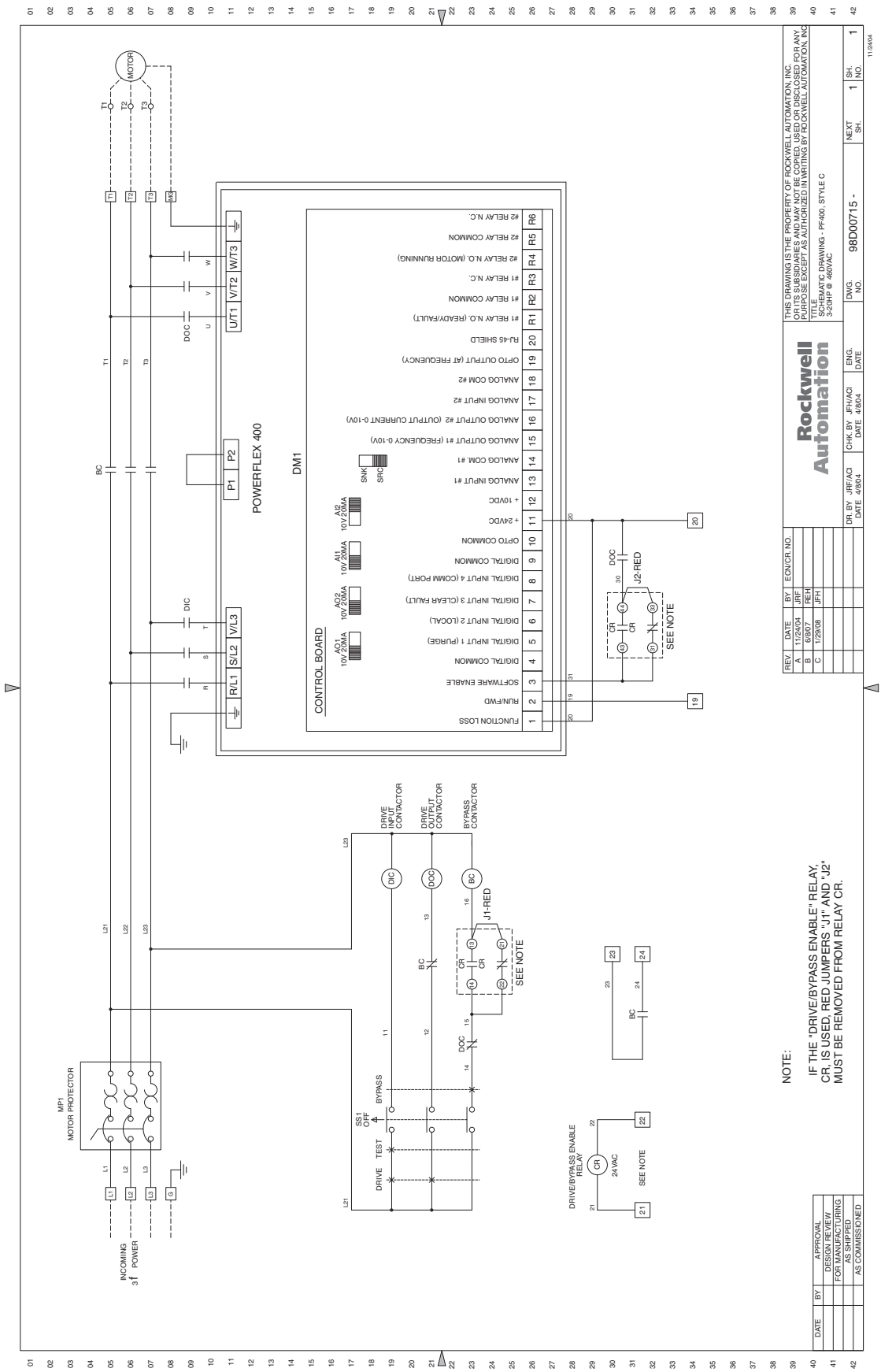


**Figure 3.3 25…60 Hp, 460V AC Drives NEMA/UL Type 1**

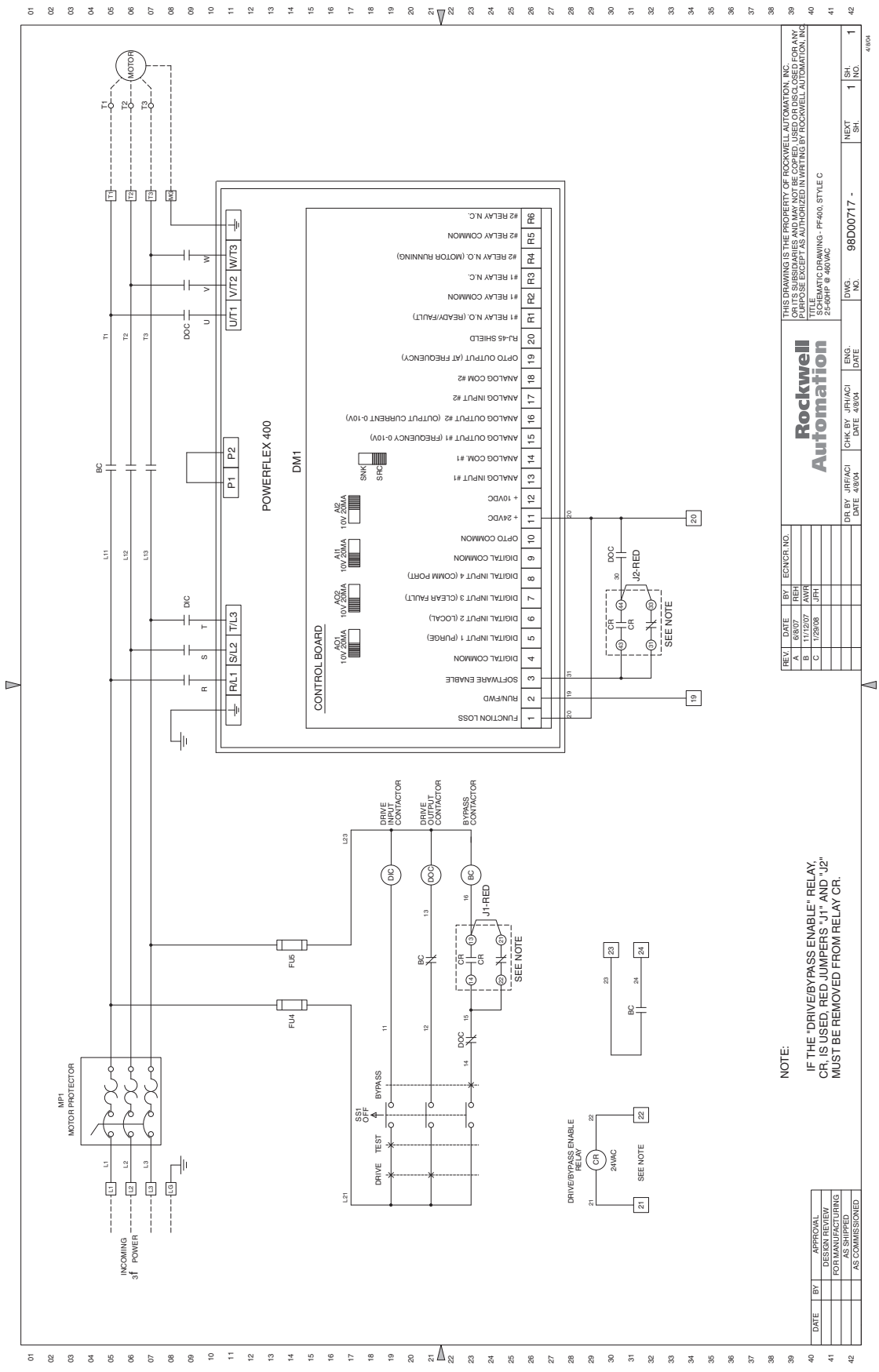
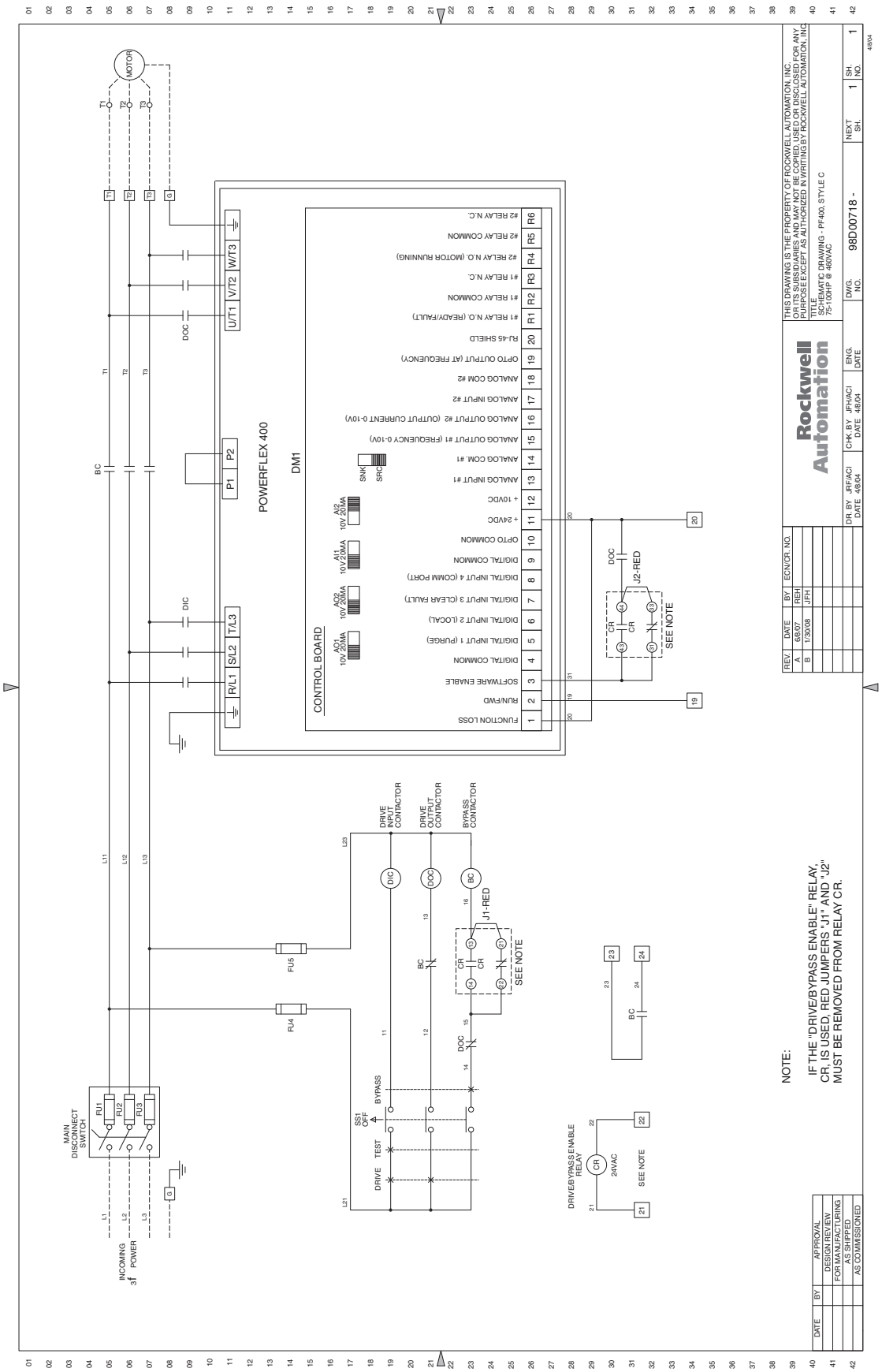
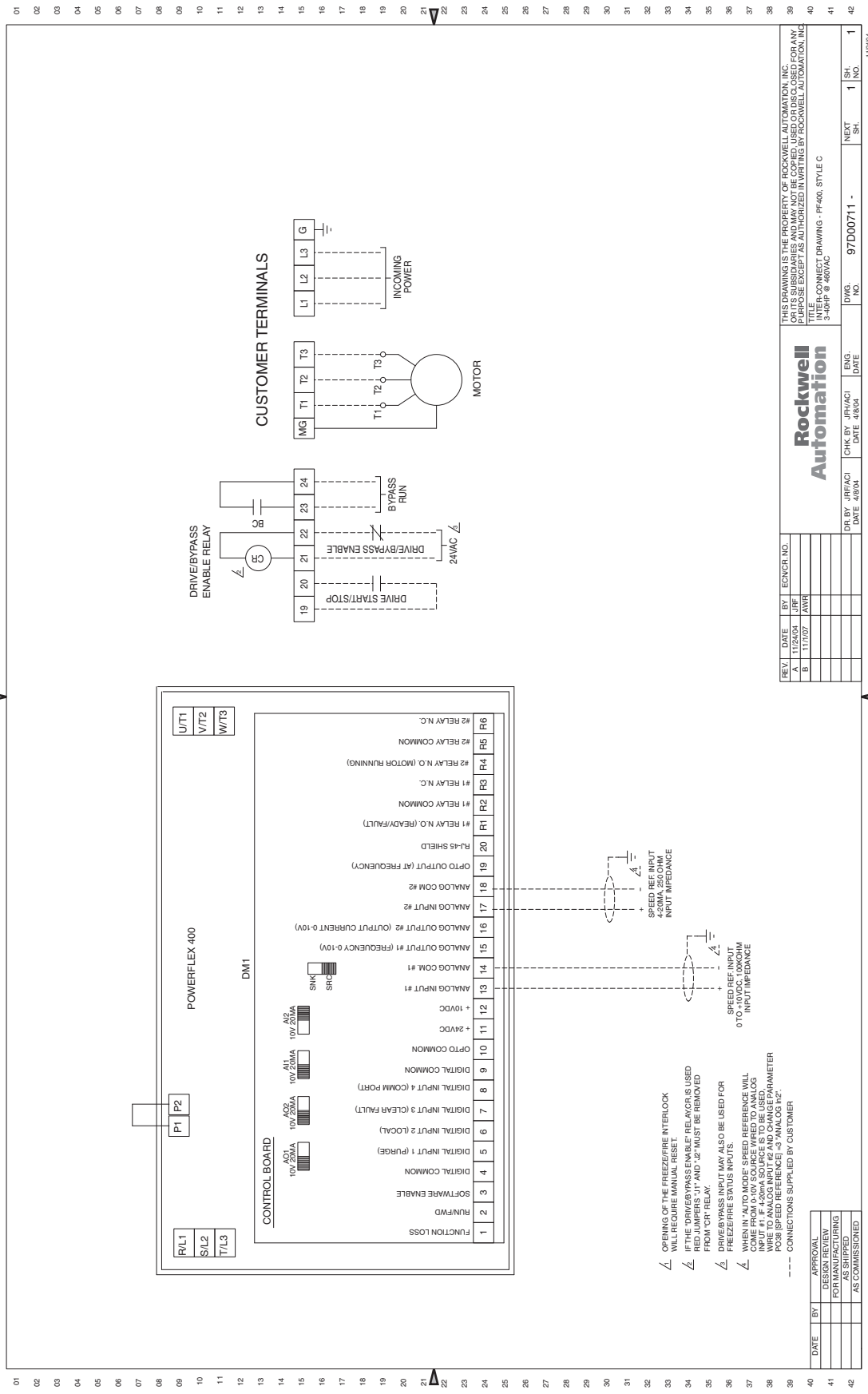


**Figure 3.4 75...100 Hp, 460V AC Drives NEMA/UL Type 1**



## Interconnect Drawings

**Figure 3.5 3.0...40 Hp, 460V AC Drives NEMA/UL Type 1**


CUSTOMER TERMINALS
INCOMING POWER
L1 L2 L3 G
MOTOR
MG T1 T2 T3
DRIVE/BYPASS ENABLE RELAY
CR
BC
BYPASS RUN
DRIVE/BYPASS ENABLE
24VAC
DRIVE START/STOP
19 20 21 22 23 24
POWERFLEX 400
DM1
CONTROL BOARD
R/L1 S/L2 T/L3
U/T1 V/T2 W/T3
P1 P2
SNK SRC
FUNCTION LOSS
RUN/FWD
SOFTWARE ENABLE
DIGITAL COMMON
DIGITAL INPUT 1 (PURGE)
DIGITAL INPUT 2 (LOCAL)
DIGITAL INPUT 3 (CLEAR FAULT)
DIGITAL INPUT 4 (COMM PORT)
DIGITAL COMMON
OPTO COMMON
+ 24VDC
+ 10VDC
ANALOG INPUT #1
ANALOG COM. #1
ANALOG OUTPUT #1 (FREQUENCY 0-10V)
ANALOG OUTPUT #2 (OUTPUT CURRENT 0-10V)
ANALOG INPUT #2
ANALOG COM #2
OPTO OUTPUT (AT FREQUENCY)
RJ-45 SHIELD
#1 RELAY N.O. (READY/FAULT)
#1 RELAY COMMON
#1 RELAY N.C.
#2 RELAY N.O. (MOTOR RUNNING)
#2 RELAY COMMON
#2 RELAY N.C.
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 R1 R2 R3 R4 R5 R6
SPEED REF. INPUT 4-20MA, 250 OHM INPUT IMPEDANCE
SPEED REF. INPUT 0 TO +10VDC, 100KOHM INPUT IMPEDANCE
1. OPENING OF THE FREEZE/FIRE INTERLOCK WILL REQUIRE MANUAL RESET.
2. IF THE 'DRIVE/BYPASS ENABLE' RELAY/CR IS USED RED JUMPERS 'J1' AND 'J2' MUST BE REMOVED FROM 'CR' RELAY.
3. DRIVE/BYPASS INPUT MAY ALSO BE USED FOR FREEZE/FIRE STATUS INPUTS.
4. WHEN IN "AUTO MODE" SPEED REFERENCE WILL COME FROM 2 OF SOURCE WIRED TO ANALOG INPUT #1 & #2. ONLY ONE SOURCE SHOULD BE WIRE TO ANALOG INPUT #2 AND CHANGE PARAMETER P038 [SPEED REFERENCE] =3 "ANALOG In2".
--- CONNECTIONS SUPPLIED BY CUSTOMER
REV DATE BY ECN/CR NO.
A 11/24/04 JRF
B 11/1/07 AWR
Rockwell Automation
DR. BY JRF/ACI DATE 4/8/04
CHK. BY JRF/ACI DATE 4/8/04
ENG. DATE
DWG. NO. 97D00711 -
NEXT SH. 1
SH. NO. 1
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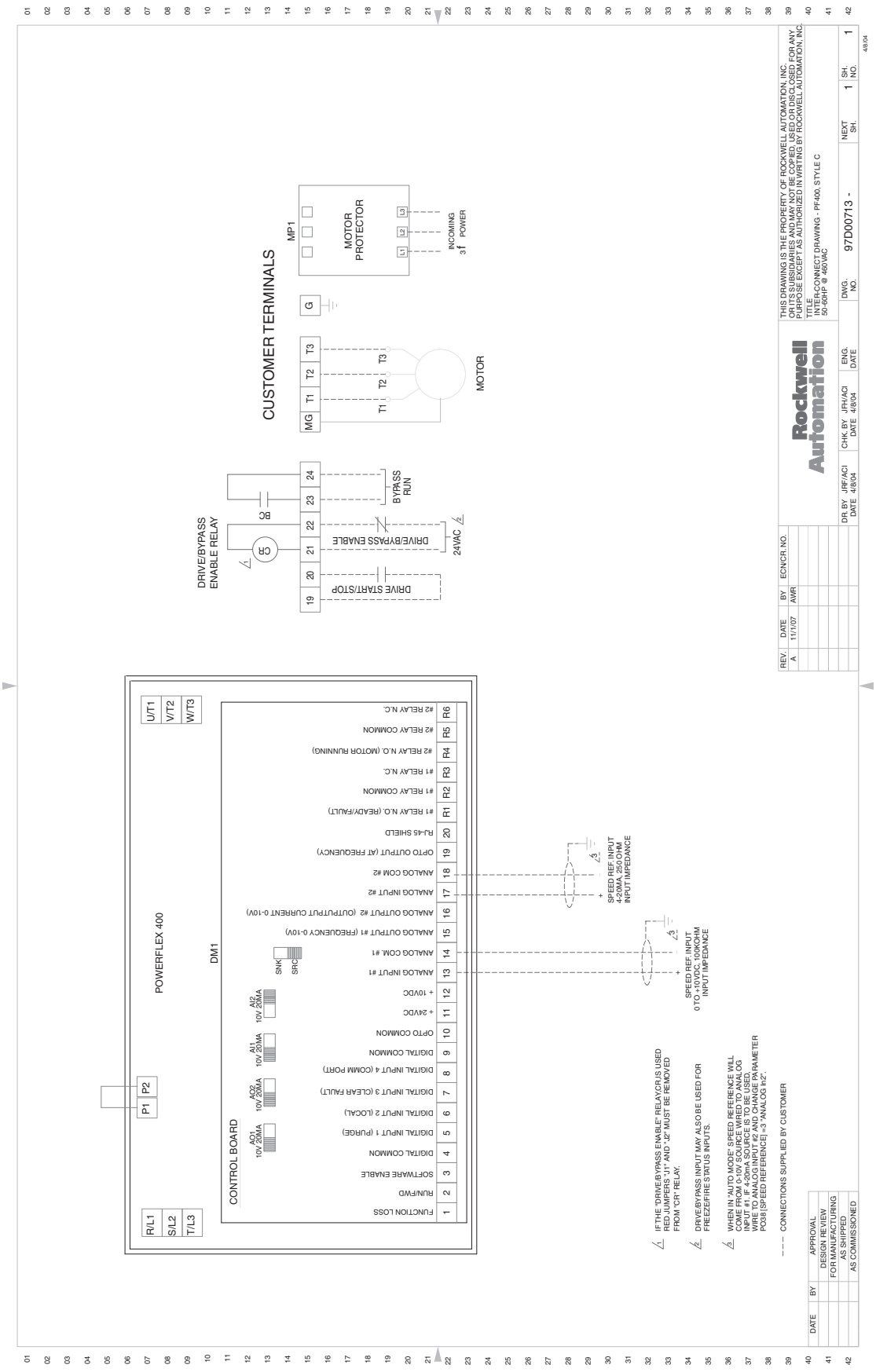
TITLE
INTER CONNECT DRAWING - PF400, STYLE C
3-40HP @ 460VAC
DATE BY APPROVAL
DESIGN REVIEW
FOR MANUFACTURING
AS SHIPPED
AS COMMISSIONED
112404

**Figure 3.6 50...60 Hp, 460V AC Drives NEMA/UL Type 1**


CUSTOMER TERMINALS
MP1
MOTOR PROTECTOR
INCOMING 3Ø POWER
MOTOR
DRIVE/BYPASS ENABLE RELAY
DRIVE START/STOP
DRIVE/BYPASS ENABLE
24VAC
BYPASS RUN
POWERFLEX 400
DM1
CONTROL BOARD
SPEED REF. INPUT 4-20MA, 250 OHM INPUT IMPEDANCE
SPEED REF. INPUT 0 TO +10VDC, 100KOHM INPUT IMPEDANCE
IF THE 'DRIVE/BYPASS ENABLE' RELAY (CR) IS USED REMOVE JUMPERS 'J1' AND 'J2' MUST BE REMOVED FROM 'CR' RELAY.
DRIVE/BYPASS INPUT MAY ALSO BE USED FOR FREEZE/FIRE STATUS INPUTS.
WHEN IN 'AUTO MODE' SPEED REFERENCE WILL COME FROM 0-10V SOURCE WIRED TO ANALOG INPUT #1 (IF 4-20mA SOURCE IS TO BE USED, WIRE TO ANALOG INPUT #2 AND CHANGE PARAMETER P038 [SPEED REFERENCE] =3 "ANALOG In2".
--- CONNECTIONS SUPPLIED BY CUSTOMER
Rockwell Automation
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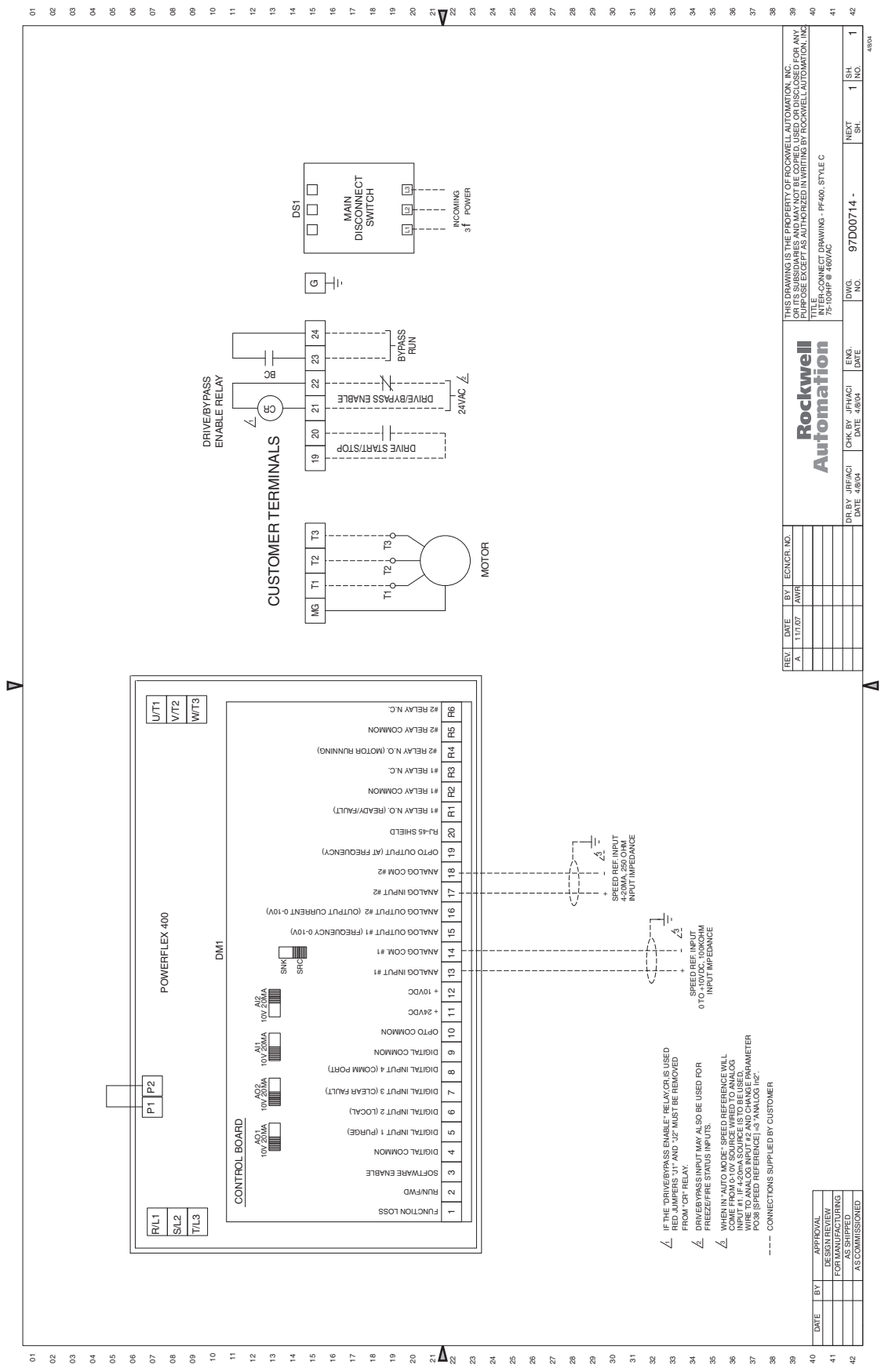
TITLE INTER-CONNECT DRAWING - PF400, STYLE C 50-60HP @ 460VAC
DWG. NO. 97D00713 -
NEXT SH. 1
SH. NO. 1
4/8/04

**Figure 3.7 75…100 Hp, 460V AC Drives NEMA/UL Type 1**



## Layout Drawings

**Figure 3.8 3.0…20 Hp, 460V AC Drives NEMA/UL Type 1**

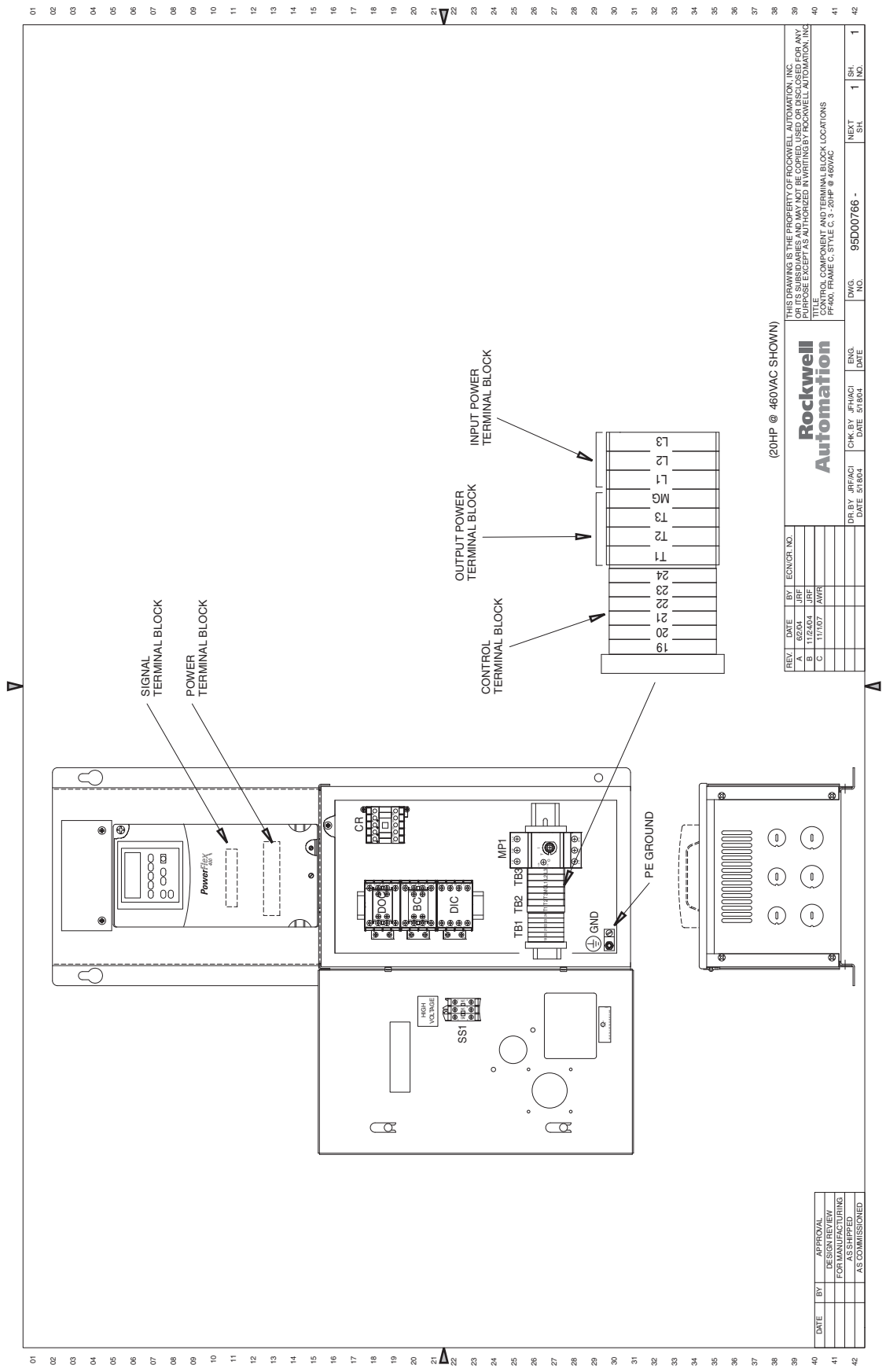


**Figure 3.9 25…40 Hp, 460V AC Drive NEMA/UL Type 1**

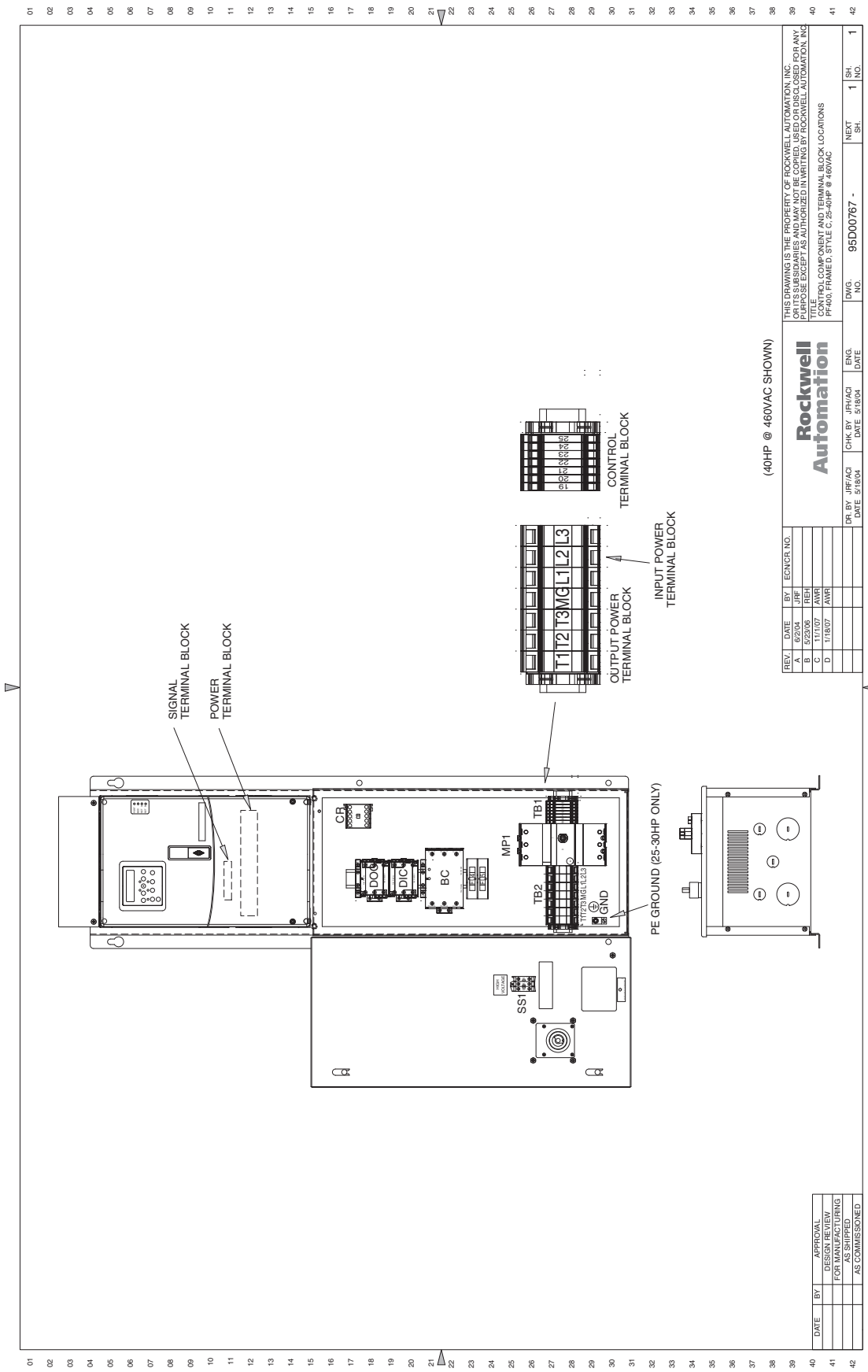


**Figure 3.10 50...60 Hp, 460V AC Drives NEMA/UL Type 1**

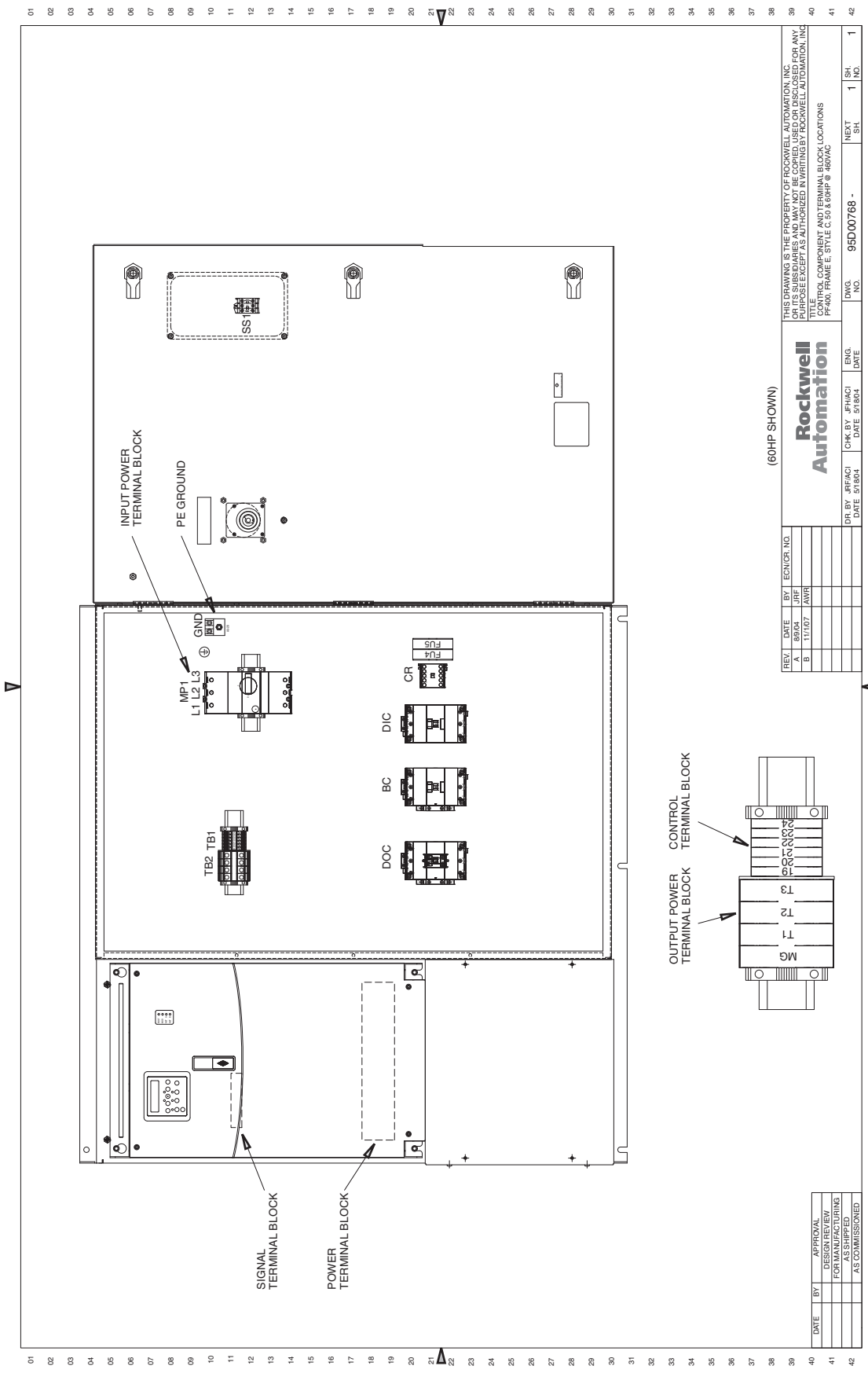
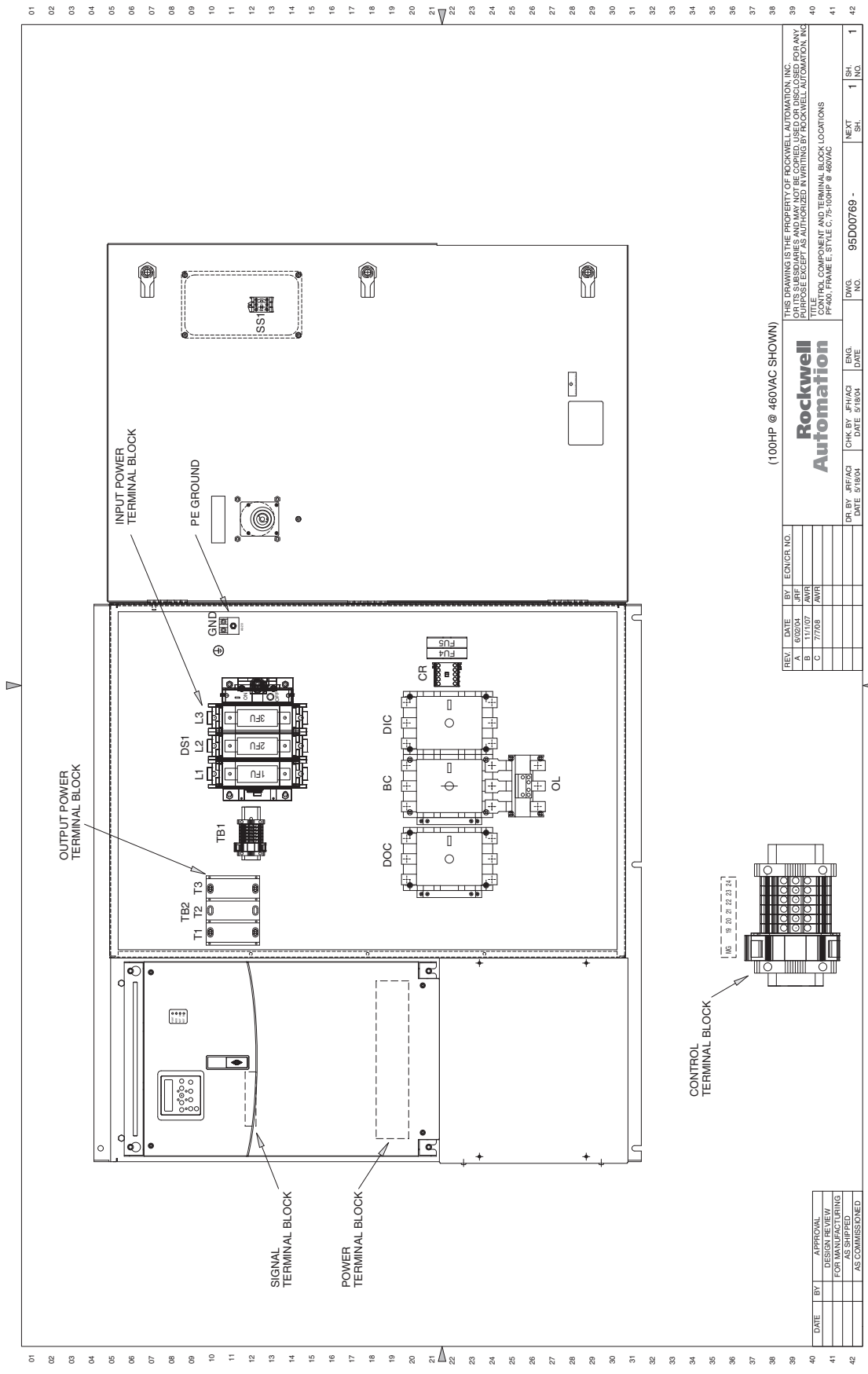


**Figure 3.11 75…100 Hp, 460V AC Drives NEMA/UL Type 1**



## Outline Drawings

**Figure 3.12 3.0…20 Hp, 460V AC Drives NEMA/UL Type 1**

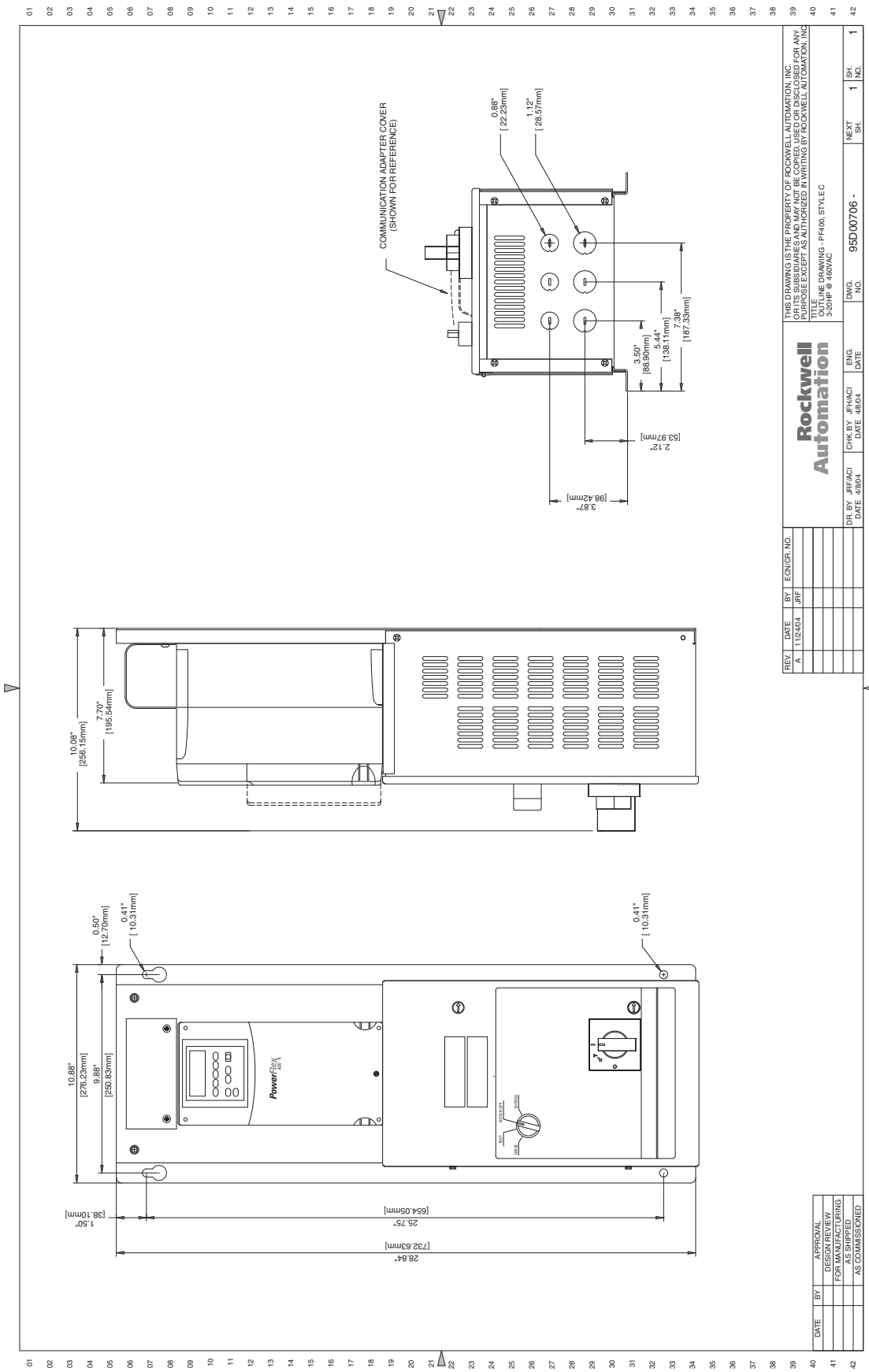


**Figure 3.13 25…40 Hp, 460V AC Drives NEMA/UL Type 1**

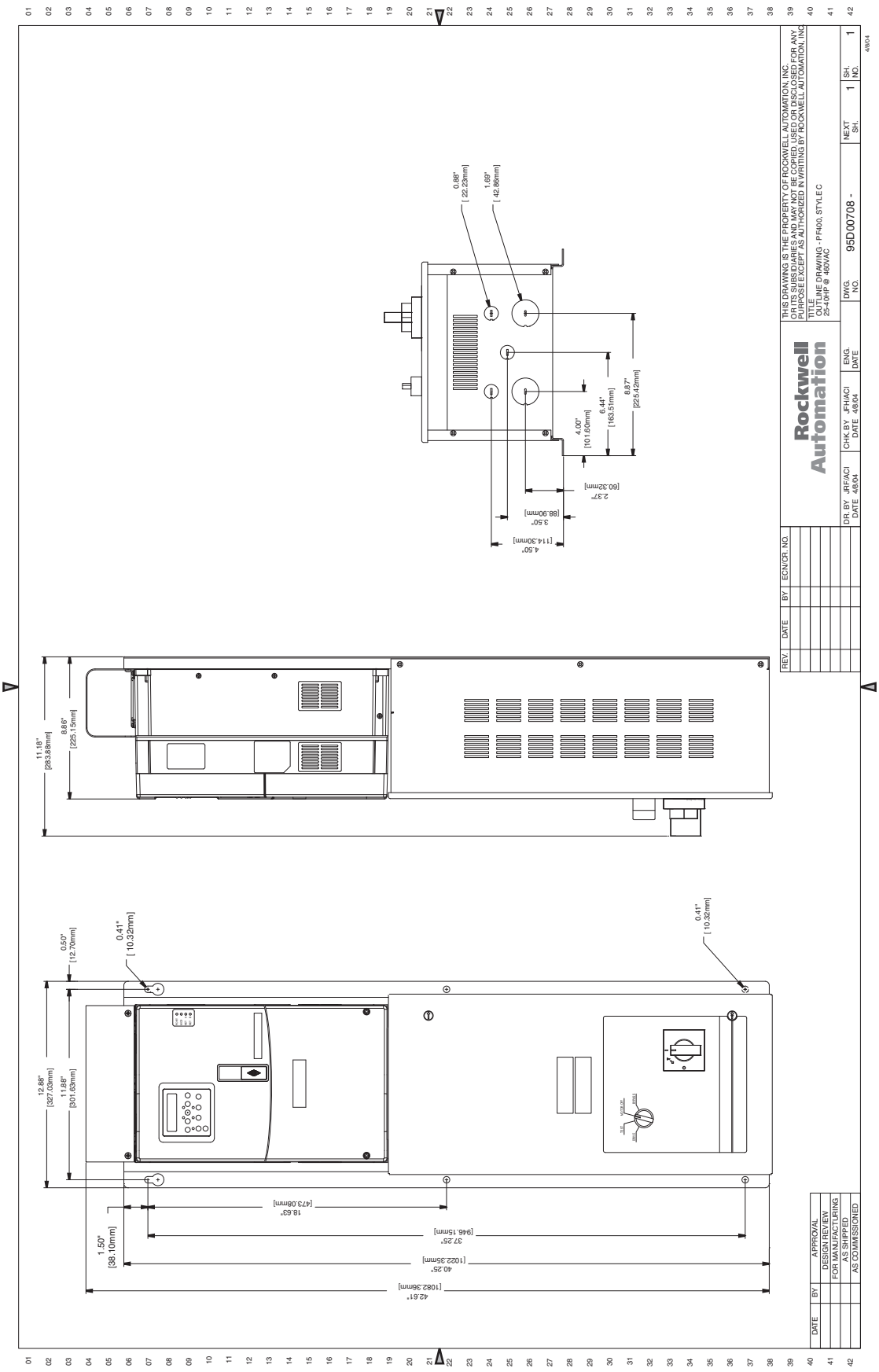
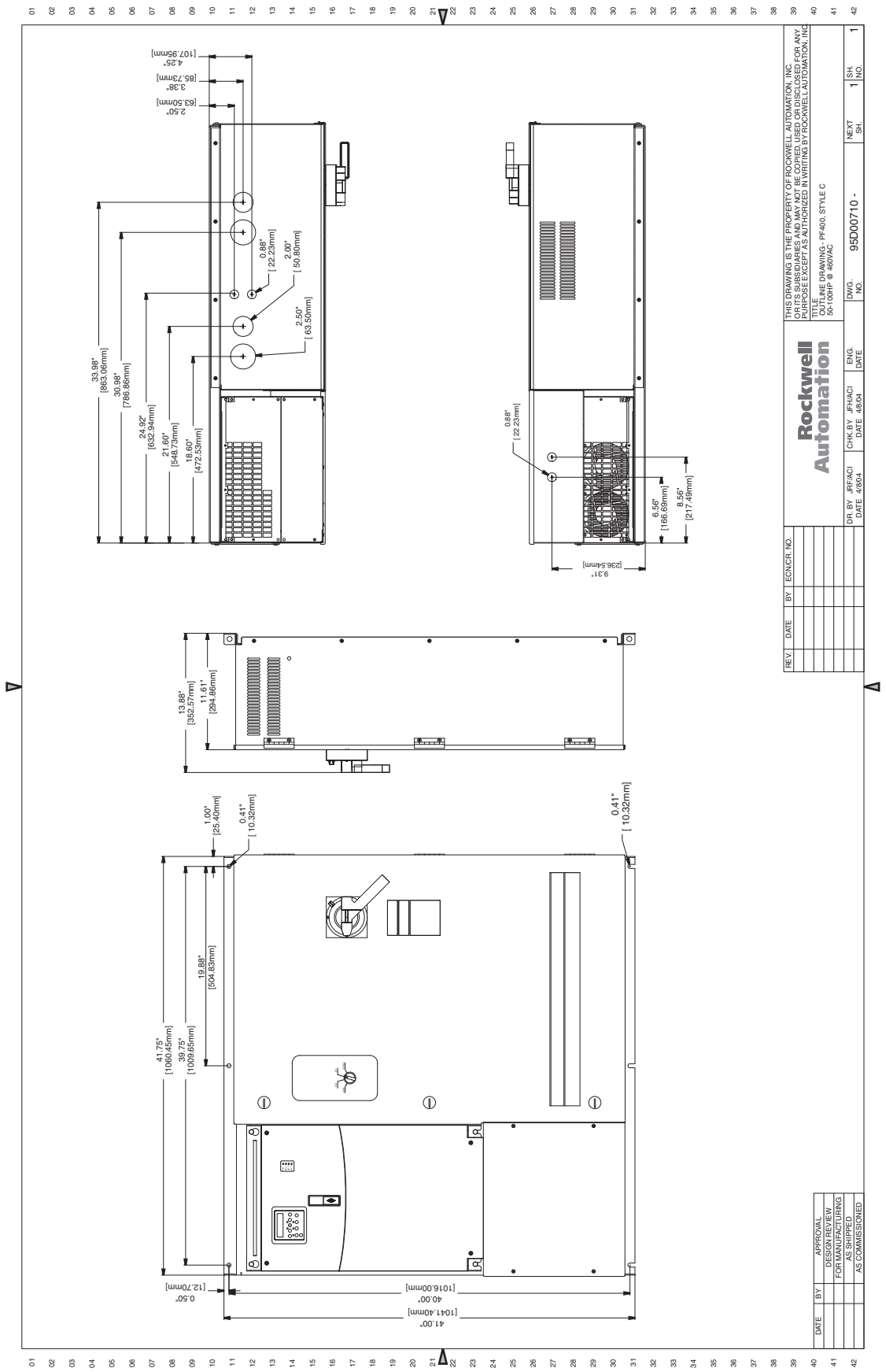


**Figure 3.14 50...100 Hp, 460V AC Drives NEMA/UL Type 1**



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# Mechanical Installation

## Chapter Objectives

This chapter provides information on mounting a PowerFlex Drive Package for Fan and Pump Applications.


| For information on ... | See page ... |
|---|---|
| Mounting Considerations | 4-1 |
| Lifting and Mounting the Drive | 4-4 |
| Watts Loss | 4-5 |


**ATTENTION:** The following information is merely a guide for proper installation. The Allen-Bradley Company cannot assume responsibility for the compliance or the noncompliance to any code, national, local or otherwise for the proper installation of this drive or associated equipment. A hazard of personal injury and/or equipment damage exists if codes are ignored during installation.

## Mounting Considerations

### Environment

Before deciding on an installation site, verify that the PowerFlex Drive Packages can be kept clean, cool and dry. The drives should be kept away from oil, coolants or other airborne contaminants.

### Maximum Surrounding Air Temperature

PowerFlex Drive Packages for Fan and Pump Applications are designed to operate at 0…40 °C (32…104 °F) surrounding air temperature.

### Minimum Mounting Clearances

Be sure there is adequate clearance for air circulation around the drive. For best air movement, do not mount drives directly above each other. Note that no devices are to be mounted behind the drive. This area must be kept clear of all control and power wiring.

**Figure 4.1 NEMA/UL Type 1 Minimum Mounting Clearances**

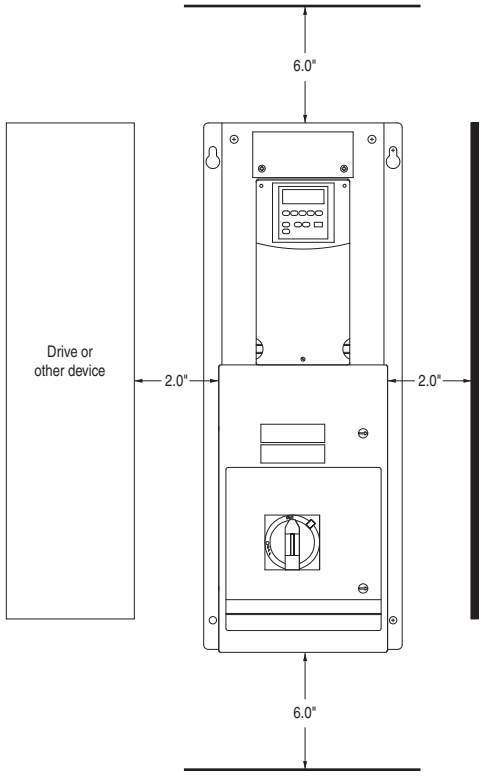



**Figure 4.2 NEMA/UL Type 12 Minimum Mounting Clearances**

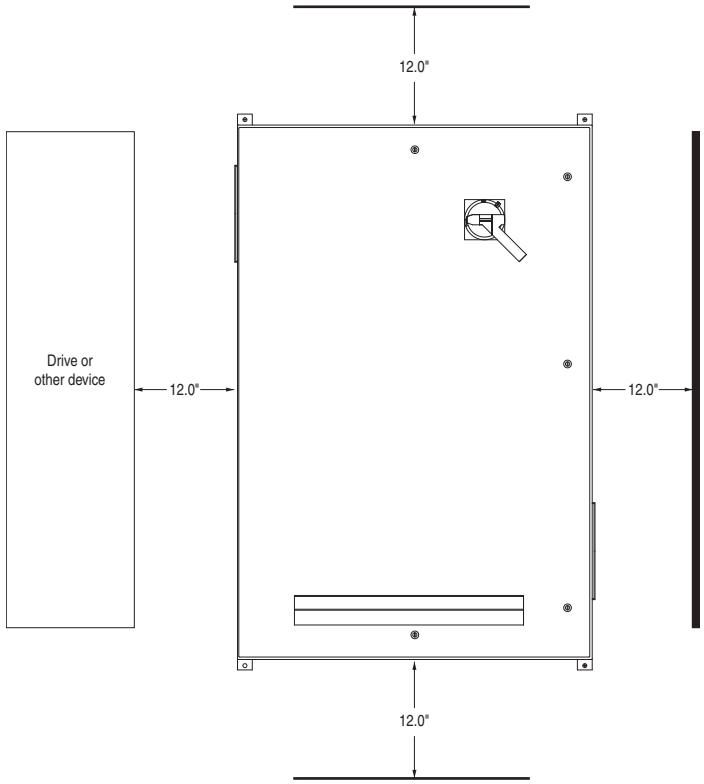


**Figure 4.3 NEMA/UL Type 4 Minimum Mounting Clearances**

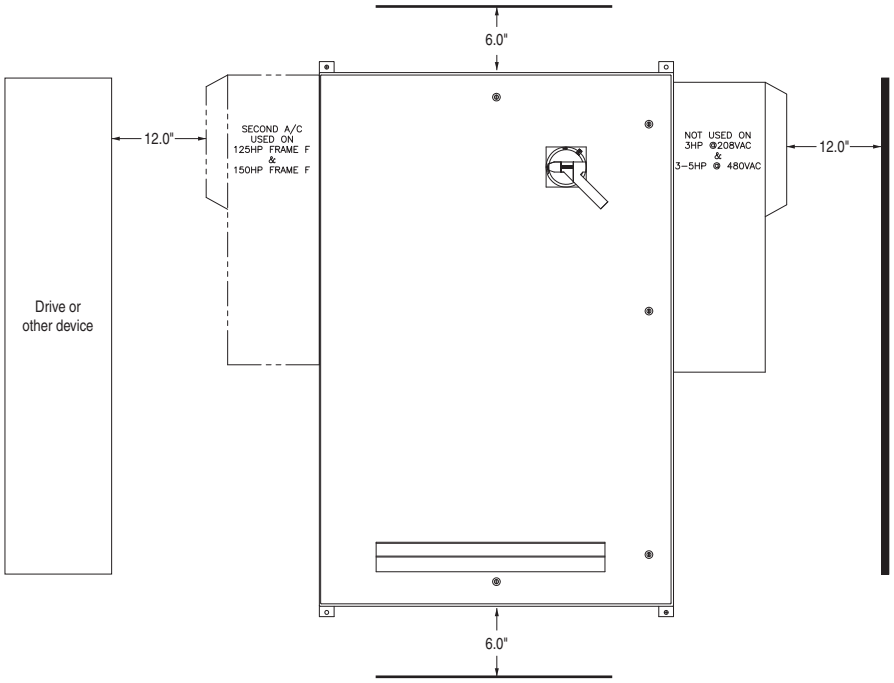
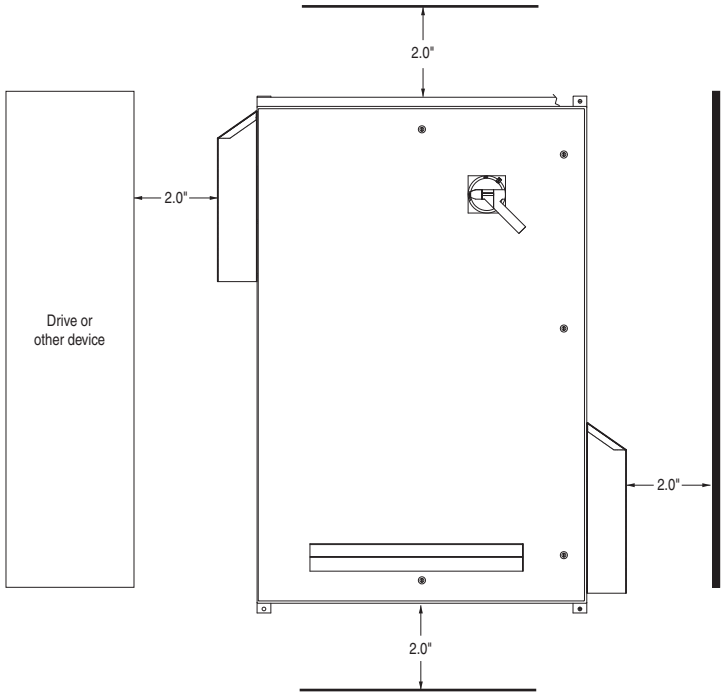


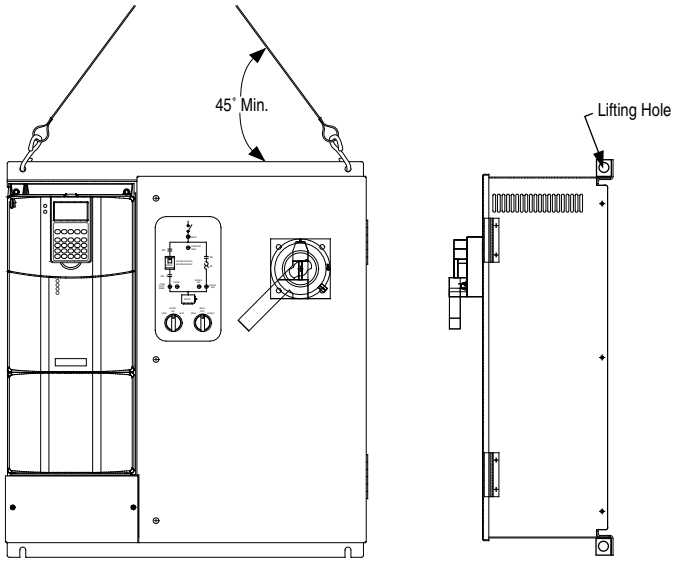

**Figure 4.4 NEMA/UL Type 3R Minimum Mounting Clearances**



## Lifting and Mounting the Drive

Care should be used to prevent damage due to dropping or jolting when moving the drive. A fork lift truck or similar means of lifting and transporting may be used. Sling in a manner that will equalize the load at the pickup points. Use a spreader bar if the angle of the sling is less than 45 degrees relative to horizontal. Do not jolt while lifting.

**Figure 4.5 Lifting the Drive**




Use the following procedure to lift and mount the drive.

1. Attach a sling with safety hooks or clevis clamps to the two lifting holes. Make certain that the angle of the sling is not less than 45 degrees relative to horizontal.
2. Using an overhead or portable hoist, attach a free-fall chain to the chain secured to the drive. Take up any vertical slack in the chain.
3. Using the hoist, lift the drive from the horizontal shipping pallet.
4. Position the drive.
5. Attach the drive to a vertical surface using the mounting holes provided. Use washers under the bolt heads.

## Watts Loss

The following table lists watt loss data for PowerFlex Drive Packages for Fan and Pump Applications running at full load, full speed and a factory default PWM frequency of 4kHz.

**Table 4.A Watts Loss at Full Load/Speed, 4 kHz**

| Voltage | kW | Hp | Total Watts |
|---|---|---|---|
| 208V AC | 2.2 | 3.0 | 180 |
| | 3.7 | 5.0 | 220 |
| | 5.5 | 7.5 | 308 |
| | 7.5 | 10 | 375 |
| | 11 | 15 | 498 |
| | 15 | 20 | 660 |
| | 18.5 | 25 | 744 |
| | 22 | 30 | 788 |
| | 30 | 40 | 1065 |
| | 37 | 50 | 1210 |
| 460V AC | 2.2 | 3.0 | 135 |
| | 3.7 | 5.0 | 195 |
| | 5.5 | 7.5 | 209 |
| | 7.5 | 10 | 253 |
| | 11 | 15 | 336 |
| | 15 | 20 | 443 |
| | 18.5 | 25 | 499 |
| | 22 | 30 | 529 |
| | 30 | 40 | 713 |
| | 37 | 50 | 810 |
| | 45 | 60 | 1132 |
| | 55 | 75 | 1288 |
| | 75 | 100 | 1560 |
| | 90 | 125 | 1910 |
| | 110 | 150 | 2310 |
| | 132 | 200 | 3711 |
| | 160 | 250 | 4208 |
| | 200 | 300 | 4916 |
| | 250 | 350 | 6167 |

## Weights

The following tables list weights for PowerFlex 400 Drive Packages for Fan and Pump Applications. Weights are approximate.

**Table 4.B Main Input Disconnect Package (Style A/M)**

| Voltage | kW | Hp | Input Line Reactor | Weight kg (lbs) |
|---|---|---|---|---|
| 208V AC | 2.2 | 3.0 | No | 13.2 (29) |
| | 3.7 | 5.0 | | 13.2 (29) |
| | 5.5 | 7.5 | | 13.2 (29) |
| | 7.5 | 10 | | 13.2 (29) |
| | 11 | 15 | | Consult Factory |
| | 15 | 20 | | Consult Factory |
| | 18.5 | 25 | | 42.2 (93) |
| | 22 | 30 | | 42.2 (93) |
| | 30 | 40 | | 68.0 (150) |
| | 37 | 50 | | Consult Factory |
| | 2.2 | 3.0 | Yes | Consult Factory |
| | 3.7 | 5.0 | | Consult Factory |
| | 5.5 | 7.5 | | Consult Factory |
| | 7.5 | 10 | | Consult Factory |
| 460V AC | 2.2 | 3.0 | No | 12.7 (28) |
| | 3.7 | 5.0 | | 12.7 (28) |
| | 5.5 | 7.5 | | 12.7 (28) |
| | 7.5 | 10 | | 12.7 (28) |
| | 11 | 15 | | 12.7 (28) |
| | 15 | 20 | | 12.7 (28) |
| | 18.5 | 25 | | 26.3 (58) |
| | 22 | 30 | | 26.3 (58) |
| | 30 | 40 | | 26.3 (58) |
| | 37 | 50 | | 61.7 (136) |
| | 45 | 60 | | 61.7 (136) |
| | 55 | 75 | | 61.7 (136) |
| | 75 | 100 | | 61.7 (136) |
| | 90 | 125 | | Consult Factory |
| | 110 | 150 | | Consult Factory |
| | 132 | 200 | | 184.6 (407) |
| | 160 | 250 | | 186.9 (412) |
| | 200 | 300 | | 362.0 (798) |
| | 250 | 350 | | 362.0 (798) |
| | 2.2 | 3.0 | Yes | 18.6 (41) |
| | 3.7 | 5.0 | | 18.6 (41) |
| | 5.5 | 7.5 | | 18.6 (41) |
| | 7.5 | 10 | | 18.6 (41) |
| | 11 | 15 | | 25.9 (57) |
| | 15 | 20 | | 25.9 (57) |

**Table 4.C 3 Contactor Full Feature Bypass with Disconnect Package (Style B/N)**

| Voltage | kW | Hp | Input Line Reactor | Weight kg (lbs) |
|---|---|---|---|---|
| 208V AC | 2.2 | 3.0 | No | 18.6 (41) |
| | 3.7 | 5.0 | | 18.6 (41) |
| | 5.5 | 7.5 | | Consult Factory |
| | 7.5 | 10 | | Consult Factory |
| | 11 | 15 | | 39.9 (88) |
| | 15 | 20 | | 39.9 (88) |
| | 18.5 | 25 | | 93.0 (205) |
| | 22 | 30 | | 93.0 (205) |
| | 30 | 40 | | Consult Factory |
| | 37 | 50 | | Consult Factory |
| | 2.2 | 3.0 | Yes | Consult Factory |
| | 3.7 | 5.0 | | Consult Factory |
| | 5.5 | 7.5 | | Consult Factory |
| | 7.5 | 10 | | Consult Factory |
| 460V AC | 2.2 | 3.0 | No | 18.1 (40) |
| | 3.7 | 5.0 | | 18.1 (40) |
| | 5.5 | 7.5 | | 18.1 (40) |
| | 7.5 | 10 | | 18.1 (40) |
| | 11 | 15 | | 24.5 (54) |
| | 15 | 20 | | 24.5 (54) |
| | 18.5 | 25 | | 34.9 (77) |
| | 22 | 30 | | 34.9 (77) |
| | 30 | 40 | | 34.9 (77) |
| | 37 | 50 | | 131.5 (290) |
| | 45 | 60 | | 131.5 (290) |
| | 55 | 75 | | 131.5 (290) |
| | 75 | 100 | | 131.5 (290) |
| | 90 | 125 | | Consult Factory |
| | 110 | 150 | | Consult Factory |
| | 132 | 200 | | 322.1 (710) |
| | 160 | 250 | | 324.3 (715) |
| | 200 | 300 | | 392.4 (865) |
| | 250 | 350 | | 408.7 (901) |
| | 2.2 | 3.0 | Yes | 23.6 (52) |
| | 3.7 | 5.0 | | 23.6 (52) |
| | 5.5 | 7.5 | | 23.6 (52) |
| | 7.5 | 10 | | 23.6 (52) |
| | 11 | 15 | | 34.0 (75) |
| | 15 | 20 | | 34.0 (75) |

**Table 4.D 3 Contactor Basic Bypass with Disconnect Package (Style C)**

| Voltage | kW | Hp | Input Line Reactor | Weight kg (lbs) |
|---|---|---|---|---|
| 460V AC | 2.2 | 3.0 | | 14.1 (31) |
| | 3.7 | 5.0 | | 14.1 (31) |
| | 5.5 | 7.5 | | 14.1 (31) |
| | 7.5 | 10 | | 14.1 (31) |
| | 11 | 15 | | 14.1 (31) |
| | 15 | 20 | | 14.1 (31) |
| | 18.5 | 25 | No | 28.1 (62) |
| | 22 | 30 | | 28.1 (62) |
| | 30 | 40 | | 28.1 (62) |
| | 37 | 50 | | 101.6 (224) |
| | 45 | 60 | | 101.6 (224) |
| | 55 | 75 | | 101.6 (224) |
| | 75 | 100 | | 101.6 (224) |

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# Electrical Installation

## Chapter Objectives

This chapter provides information on electrical installation of a PowerFlex Drive Package for Fan and Pump Applications.


| For information on . . | See page |
|---|---|
| Power Wire Size Requirements | 5-1 |
| Power Terminal Block Specification | 5-1 |
| Control and Signal Wiring | 5-2 |
| Installing Input Power Wiring | 5-2 |
| Installing Output Power Wiring | 5-3 |
| Installing an Optional Transformer or Reactor | 5-3 |


## Power Wire Size Requirements

Wire size should be determined based on the size of the conduit openings, and applicable local, national and international codes such as NEC/CEC.

**ATTENTION:** National codes and standards (NEC, VDE, BSI, etc.) and local codes outline provisions for safely installing electrical equipment. Installation must comply with specifications regarding wire types, conductor sizes, branch circuit protection, and disconnect devices. Failure to do so may result in personal injury and/or equipment damage.

## Power Terminal Block Specification

Input power wiring should be sized according to applicable codes to handle the drive's continuous-rated input current. Output wiring should be sized according to applicable codes to the handle the drive's continuous-rated output current. See Table 5.A for the range of power wire sizes that the terminals can accommodate.

**Table 5.A Power Wire Sizes**

| Name | Package | Hp | | Wire Size Range | | Torque |
|---|---|---|---|---|---|---|
| | | 208V AC | 480V AC | Minimum | Maximum | |
| Input Power L1(R), L2 (S), L3 (T) | A, B | 3...5 | 1...10 | 14 AWG | 8 AWG | 12 |
| | | 7.5...10 | 15...25 | 14 AWG | 4 AWG | 35 |
| | | 15...20 | 30...50 | 14 AWG | 2 AWG | 35 |
| | | 25...40 | 60...100 | 6 AWG | 250 MCM | 275 |
| | | 50 | 125...200 | (2) 1/0 | 350 MCM | 275 |
| | | – | 250...300 | (2) 2/0 | 350 MCM | 275 |
| | | – | 350 | (3) 3/0 | 350 MCM | 275 |
| | C | – | 3...7.5 | 22 AWG | 8 AWG | 13 |
| | | – | 10...30 | 14 AWG | 4 AWG | 19 |
| | | – | 40 | 12 AWG | 1/0 AWG | 40 |
| | | – | 50...60 | 12 AWG | 2 AWG | 90 |
| | | – | 75...100 | 6 AWG | 250 MCM | 275 |

| Name | Package | Hp | | Wire Size Range | | Torque |
|---|---|---|---|---|---|---|
| | | 208V AC | 480V AC | Minimum | Maximum | |
| Output Power T1(U), T2(V), T3(W) | A | 3...10 | 3...20 | 16 AWG | 8 AWG | 26 |
| | | 15...30 | 25...40 | 8 AWG | 2 AWG | 45 |
| | | – | 50...60 | 12 AWG | 2 AWG | 49.5 |
| | | 40...50 | 75...150 | 1/0 AWG | 4/0 AWG | 173 |
| | | – | 200...250 | (1) | (1) | 260 |
| | | – | 300...350 | (1) | (1) | 354 |
| | B | 3...7.5 | 3...7.5 | 22 AWG | 8 AWG | 13 |
| | | 10...20 | 10...30 | 14 AWG | 4 AWG | 19 |
| | | 25...30 | 40...75 | 12 AWG | 1/0 AWG | 40 |
| | | – | 100...150 | 6 AWG | 350 MCM | 275 |
| | | 40...50 | 200...300 | (2) 4 AWG | 350 MCM | 500 |
| | | – | 350 | (2) 250 MCM | 750 MCM | 375 |
| | C | – | 3...7.5 | 22 AWG | 8 AWG | 13 |
| | | – | 10...30 | 14 AWG | 4 AWG | 19 |
| | | – | 40...75 | 12 AWG | 1/0 AWG | 40 |
| | | – | 100 | (2) 1/0 AWG | 350 MCM | 275 |

(1) Threaded studs provided for wire lugs.

## Control and Signal Wiring

The terminal block on the Main Control board provides terminals for 24 V DC power for the eight remote control inputs and outputs. The terminal block in the options cabinet provides terminals for 115 V AC power for the remote control inputs and outputs. The options cabinet terminal block is factory-wired to the terminal block on the Main Control board.

## Installing Input Power Wiring

**ATTENTION:** Protect the contents of the options cabinet from metal chips and other debris while drilling the conduit openings. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

**ATTENTION:** Do not route signal and control wiring with power wiring in the same conduit. This can cause interference with drive operation. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

To connect AC input power to the drive:

❑ Step 1. Wire the AC input power leads by routing them according to drive type. Power wiring sizes are listed in Table 5.A.

❑ Step 2. Connect the three-phase AC input power leads (three-wire V AC) to the appropriate terminals. Connect the AC input power leads to terminals R/L1, S/L2, T/L3 on the power terminal block.

❑ Step 3. Tighten the AC input power terminals to the proper torque according to drive type as shown in Table 5.A.

## Installing Output Power Wiring

**ATTENTION:** Unused wires in conduit must be grounded at both ends to avoid a possible shock hazard caused by induced voltages. Also, if a drive sharing a conduit is being serviced or installed, all drives using this conduit should be disabled to eliminate the possible shock hazard from cross-coupled motor leads. Failure to observe these precautions could result in bodily injury.

**ATTENTION:** Do not route signal and control wiring with power wiring in the same conduit. This can cause interference with drive operation. Failure to observe these precautions could result in damage to, or destruction of, the equipment.

To connect the AC output power wiring from the drive to the motor:

❑ Step 1. Wire the three-phase AC output power motor leads by routing them according to the drive option type. Note that you must punch openings in the option cabinet of the desired conduit size, following NEC and all applicable local codes and standards.

Do not route more than three sets of motor leads through a single conduit. This will minimize cross-talk that could reduce the effectiveness of noise reduction methods. If more than three drive/motor connections per conduit are required, shielded cable must be used. If possible, each conduit should contain only one set of motor leads.

❑ Step 2. Connect the three-phase AC output power motor leads to terminals U/T1, V/T2, W/T3 on the power terminal block located in the options cabinet.

❑ Step 3. Tighten the three-phase AC output power terminals to the proper torque according to drive type as shown in Table 5.C.

The following sections describe incoming line components and how to install them. Note that fuses and an input disconnect are also available as factory-installed options.

## Installing an Optional Transformer or Reactor

Input isolation transformers might be needed to help eliminate:

- Damaging AC line voltage transients from reaching the drive.
- Line noise from the drive back to the incoming power source.
- Damaging currents that could develop if a point inside the drive becomes grounded.

Observe these guidelines when installing an isolation transformer:

- A power disconnecting device must be installed between the power line and the primary of the transformer.
- If the user-installed power disconnecting device is a circuit breaker, the circuit breaker trip rating must be coordinated with the in-rush current (10 to 12 times full load current) of the transformer.
- Do not use an input isolation transformer rated more than 1000 kVA for 480 V AC (500 kVA for 208 V AC) with less than 5% impedance directly ahead of the drive without additional impedance between the drive and the transformer.

Table 5.B shows recommended inductance and line reactor ratings.

**Table 5.B AC Line Reactors**

| Drive (Hp) | Line Reactor Inductance (±10%) |
|---|---|
| 2…3 | 6.5 mH |
| 5 | 3.0 mH |
| 7.5 | 2.5 mH |
| 10 | 1.5 mH |
| 15 | 1.2 mH |
| 20 | 0.8 mH |
| 25 | 0.8 mH |
| 30 | 0.7 mH |
| 40 | 0.5 mH |
| 50 to 60 | 0.4 mH |
| 75 | 0.3 mH |
| 100 | 0.2 mH |
| 125 | 0.15 mH |
| 150 | 0.11 mH |

## Installing Fuses for Branch Circuit Protection

If they were not installed as a factory option, install the required branch circuit protection fuses according to the applicable local, national, and international codes (such as NEC/CEC). The fuses must be installed in the line before the drive input terminals.

**ATTENTION:** Most codes require that upstream branch protection be provided to protect input power wiring. Failure to observe this precaution could result in severe bodily injury or loss of life.

## Installing the Required External/Separate Input Disconnect

An input disconnect must be installed in the line before the drive input terminals in accordance with local, national, and international codes, such as NEC/CEC. If an input disconnect is not installed as a factory option, the disconnect should be sized according to the in-rush current as well as any additional loads the disconnect might supply. The trip rating for the in-rush current (10 to 12 times full load current) should be coordinated with that of the input isolation transformer, if used.

## Installing Input/Output Power Wiring

**Table 5.C Style A Terminals**

| 208V AC Hp | 480V AC Hp | Maximum Tightening Torque |
|---|---|---|
| **Input Power** | | |
| 3…5 | 1…10 | 12 lb•in |
| 7.5…10 | 15…25 | 35 lb•in |
| 15…20 | 30…50 | 35 lb•in |
| 25…50 | 60…350 | 275 lb•in |
| **Output Power** | | |
| 3…10 | 3…20 | 26 lb•in |
| 15…30 | 25…40 | 45 lb•in |
| – | 50…60 | 49.5 lb•in |
| 40…50 | 75…150 | 173 lb•in |
| – | 200…250 | 260 lb•in |
| – | 300…350 | 354 lb•in |

**Table 5.D Style B Terminals**

| 208V AC Hp | 480V AC Hp | Maximum Tightening Torque |
|---|---|---|
| **Input Power** | | |
| 3…5 | 1…10 | 12 lb•in |
| 7.5…10 | 15…25 | 35 lb•in |
| 15…20 | 30…50 | 35 lb•in |
| 25…50 | 60…350 | 275 lb•in |
| **Output Power** | | |
| 3…7.5 | 3…7.5 | 13 lb•in |
| 10…20 | 10…30 | 19 lb•in |
| 25…30 | 40…75 | 40 lb•in |
| – | 100…150 | 275 lb•in |
| 40…50 | 200…300 | 500 lb•in |
| – | 350 | 375 lb•in |

**Table 5.E Style C Input Power Terminal Tightening Torque**

| 208V AC Hp | 480V AC Hp | Maximum Tightening Torque |
|---|---|---|
| – | 3…7.5 | 13 lb•in |
| – | 10…30 | 20 lb•in |
| – | 40 | 22 lb•in |
| – | 50…60 | 120 lb•in |
| – | 75…100 | 275 lb•in |
| **Output Power** | | |
| – | 3…7.5 | 13 lb•in |
| – | 10…30 | 19 lb•in |
| – | 40…75 | 40 lb•in |
| – | 100 | 275 lb•in |

## Notes:

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# Supplemental Information

## Specifications

| Category | Specification | |
|---|---|---|
| **Environment** | Altitude: | 1000 m (3300 ft.) max. without derating |
| | Surrounding Air Temperature without Derating: | 0 to 40° C (32 to 104° F) |
| | Storage Temperature (all const.): | -40 to 70° C (-40 to 158° F) |
| | Relative Humidity: | 5 to 95% non-condensing |
| | Shock: | 15 G peak for 11 ms duration (+/- 1.0 ms) |
| | Vibration: | 0.152 mm (0.006 in.) displacement, 1 G peak, 5.5 Hz |
| **All Others** | Refer to the PowerFlex 400 User Manual. | |

## Notes:

# Replacement Parts

## Common Parts

Components are manufactured by Allen-Bradley except as noted.

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| Description | Designation | Voltage | Hp | Part Number |
|---|---|---|---|---|
| Drive Module | DM1 | 208V AC | 3.0 | 22C-B012N103 |
| | | | 5.0 | 22C-B017N103 |
| | | | 7.5 | 22C-B024N103 |
| | | | 10 | 22C-B033N103 |
| | | | 15 | 22C-B049A103 |
| | | | 20 | 22C-B065A103 |
| | | | 25 | 22C-B075A103 |
| | | | 30 | 22C-B090A103 |
| | | | 40 | 22C-B120A103 |
| | | | 50 | 22C-B145A103 |
| | | 460V AC | 3.0 | 22C-D6P0N103 |
| | | | 5.0 | 22C-D010N103 |
| | | | 7.5 | 22C-D012N103 |
| | | | 10 | 22C-D017N103 |
| | | | 15 | 22C-D022N103 |
| | | | 20 | 22C-D030N103 |
| | | | 25 | 22C-D038A103 |
| | | | 30 | 22C-D045A103 |
| | | | 40 | 22C-D060A103 |
| | | | 50 | 22C-D072A103 |
| | | | 60 | 22C-D088A103 |
| | | | 75 | 22C-D105A103 |
| | | | 100 | 22C-D142A103 |
| | | | 125 | 22C-D170A103 |
| | | | 150 | 22C-D208A103 |
| | | | 200 | 22C-D260A103 |
| | | | 250 | 22C-D310A103 |
| | | | 300 | 22C-D370A103 |
| | | | 350 | 22C-D460A103 |
| Comm Cards | C | All | All | 22-COMM-C |
| | D | | | 22-COMM-D |
| | E | | | 22-COMM-E |
| | P | | | 22-COMM-P |
| | B | | | 22-COMM-B |
| | L | | | 22-COMM-L |
| Comm Cover | | 208V AC | 3.0…10 | 22C-CCC |
| | | 460V AC | 3.0…20 | 22C-CCC |
| Line Reactors | LR | 208V AC | 3 | 1321-3R12-A |
| | | | 5 | 1321-3R18-A |
| | | | 7.5 | 1321-3R25-A |
| | | | 10 | 1321-3R35-A |
| | | | 15 | 1321-3R45-A |
| | | | 20 | 1321-3R55-A |
| | | | 25 | 1321-3R80-A |
| | | | 30 | 1321-3R100-A |
| | | | 40…50 | 1321-3R130-A |
| | | 460V AC | 3 | 1321-3R8-C |
| | | | 5 | 1321-3R8-B |
| | | | 7.5 | 1321-3R12-B |

| Description | Designation | Voltage | Hp | Part Number |
|---|---|---|---|---|
| Line Reactors (continued) | LR | 460V AC | 10 | 1321-3R18-B |
| | | | 15 | 1321-3R25-B |
| | | | 20…25 | 1321-3R35-B |
| | | | 30 | 1321-3R45-B |
| | | | 40 | 1321-3R55-B |
| | | | 50…60 | 1321-3R80-B |
| | | | 75 | 1321-3R100-B |
| | | | 100 | 1321-3R130-B |
| | | | 125 | 1321-3R160-B |
| | | | 150 | 1321-3R200-B |

## Disconnect Parts

Components are manufactured by Allen-Bradley except as noted.

| Description | Designation | Voltage | Hp | Part Number |
|---|---|---|---|---|
| **Style A/B Fused Disconnect Packages** | | | | |
| Disconnect Switch | DS | 208V AC | 3.0…5.0 | 194R-NJ30P3 |
| | | | 7.5…10 | 194R-NJ60P3 |
| | | | 15…20 | 194R-NJ100P3 |
| | | | 25…40 | 194R-NJ200P3 |
| | | | 50 | 194R-NJ400P3 |
| | | 460V AC | 3.0…10 | 194R-NJ30P3 |
| | | | 15…25 | 194R-NJ60P3 |
| | | | 30…50 | 194R-NJ100P3 |
| | | | 60…100 | 194R-NJ200P3 |
| | | | 125…200 | 194R-NJ400P3 |
| | | | 250 | 140U-Q6D3-D50 |
| | | | 300 | 140U-Q6D3-D60 |
| | | | 350 | 140U-M6D3-D70 |
| Operator Handle (NEMA/UL Type 1) | | 208V AC | 3.0…10 | 194R-HS1 |
| | | | 15…50 | 194R-HM1 |
| | | 460V AC | 3.0…25 | 194R-HS1 |
| | | | 30…200 | 194R-HM1 |
| Operator Handle (NEMA/UL Type 12, 3R, 4) | | 208V AC | 3.0…10 | 194R-HS4 |
| | | | 15…50 | 194R-HM4 |
| | | 460V AC | 3.0…25 | 194R-HS4 |
| | | | 30…200 | 194R-HM4 |
| Operator Shaft | | 208V AC | 3.0…10 | 194R-R2 |
| | | | 15…50 | 194R-R4 |
| | | 460V AC | 3.0…25 | 194R-R2 |
| | | | 30…100 | 194R-R4 |
| | | | 125…200 | 194R-R6 |
| Main Fuses | FU1…FU3 | 208V AC | 3.0 | AJT-20[1] |
| | | | 5.0 | AJT-20[1] |
| | | | 7.5 | AJT-35[1] |
| | | | 10 | AJT-40[1] |
| | | | 15 | AJT-80[1] |
| | | | 20 | AJT-100[1] |
| | | | 25 | AJT-125[1] |
| | | | 30 | AJT-150[1] |
| | | | 40 | AJT-200[1] |
| | | | 50 | AJT-250[1] |

| Description | Designation | Voltage | Hp | Part Number |
|---|---|---|---|---|
| Main Fuses (continued) | FU1…FU3 | 460V AC | 3.0 | AJT-10[1] |
| | | | 5.0 | AJT-15[1] |
| | | | 7.5…10 | AJT-20[1] |
| | | | 15…20 | AJT-35[1] |
| | | | 25 | AJT-60[1] |
| | | | 30 | AJT-70[1] |
| | | | 40 | AJT-80[1] |
| | | | 50 | AJT-100[1] |
| | | | 60 | AJT-150[1] |
| | | | 75 | AJT-175[1] |
| | | | 100 | AJT-200[1] |
| | | | 125 | AJT-250[1] |
| | | | 150 | AJT-350[1] |
| | | | 200 | AJT-400[1] |
| **Style M/N Circuit Breaker Packages** | | | | |
| Circuit Breakers | CB1 | 208V AC | 3 | 140U-H3C3-C15 |
| | | | 5 | 140U-H3C3-C30 |
| | | | 7.5 | 140U-H3C3-C40 |
| | | | 10 | 140U-H3C3-C50 |
| | | | 15 | 140U-H3C3-C80 |
| | | | 20 | 140U-H3C3-D10 |
| | | | 25 | 140U-H3C3-D12 |
| | | | 30 | 140U-J3D3-D15 |
| | | | 40 | 140U-J3D3-D20 |
| | | | 50 | 140U-J6D3-D22 |
| | | 460V AC | 3.0…5 | 140U-H6C3-C15 |
| | | | 7.5 | 140U-H6C3-C20 |
| | | | 10 | 140U-H6C3-C25 |
| | | | 15 | 140U-H6C3-C35 |
| | | | 20 | 140U-H6C3-C40 |
| | | | 25 | 140U-H6C3-C50 |
| | | | 30 | 140U-H6C3-C60 |
| | | | 40 | 140U-H6C3-C80 |
| | | | 50 | 140U-H6C3-D10 |
| | | | 60 | 140U-H6C3-D12 |
| | | | 75 | 140U-J6D3-D15 |
| | | | 100 | 140U-J6D3-D20 |
| | | | 125 | 140U-J6D3-D25 |
| | | | 150 | 140U-K6D3-D30 |
| | | | 200 | 140U-K6D3-D35 |
| | | | 250 | 140U-Q6D3-D50 |
| | | | 300 | 140U-Q6D3-D60 |
| | | | 350 | 140U-M6D3-D70 |
| Operator Handle Kit | | 208V AC | 3.0…25 | 140U-H-RVM12B |
| | | | 30…50 | 140U-J-RVM12B |
| | | 460V AC | 3.0…60 | 140U-H-RVM12B |
| | | | 75…125 | 140U-J-RVM12B |
| | | | 150…200 | 140U-K-RVM12B |
| | | | 250…350 | 140U-M-RVM21B |

| Description | Designation | Voltage | Hp | Part Number |
|---|---|---|---|---|
| Terminal Lugs | | 208V AC | 3.0…25 | - |
| | | | 30…50 | 140U-J-TLA1 |
| | | 460V AC | 3.0…60 | - |
| | | | 75…125 | 140U-J-TLA1 |
| | | | 150…200 | 140U-K-TLA1 |
| | | | 250…300 | 140U-Q-TLA2 |
| | | | 350 | 140U-M-TLA3 |
| **Style C Basic Bypass Packages** | | | | |
| Motor Protector | MP1 | 460V AC | 3.0…5.0 | 140M-C2E-C10 |
| | | | 7.5…10 | 140M-D8E-C16 |
| | | | 15 | 140M-D8E-C25 |
| | | | 20 | 140M-F8E-C32 |
| | | | 25 | 140M-F8E-C45 |
| | | | 30 | 140-CMN-4300 |
| | | | 40 | 140-CMN-6300 |
| | | | 50…60 | 140-CMN-9000 |
| Disconnect Switch | DS | 460V AC | 75…100 | 194R-NJ200P3 |
| Main Fuses | FU1…FU3 | 460V AC | 75 | AJT-175(1) |
| | | | 100 | AJT-200(1) |
| Operator Handle | | 460V AC | 3.0…60 | 140M-C-DN66 |
| | | | 75…100 | 194R-HM1 |
| Operator Shaft | | 460V AC | 3.0…60 | 140M-C-DN66 |
| | | | 75…100 | 194R-R4 |

(1) Manufactured by Gould-Shawmut.

## Bypass Parts

Components are manufactured by Allen-Bradley except as noted.

| Description | Designation | Voltage | Hp | Part Number |
|---|---|---|---|---|
| **Style B/N Full Feature Bypass Packages** | | | | |
| Bypass Contactor | BC | 208V AC | 5.0 | 100-C23D10 |
| | | | 7.5…10 | 100-C37D00 |
| | | | 15 | 100-C60D00 |
| | | | 20 | 100-C72D00 |
| | | | 25 | 100-C85D00 |
| | | | 30…40 | 100-D110ED11 |
| | | | 50 | 100-D180ED11 |
| | | 460V AC | 3.0…10 | 100-C16D10 |
| | | | 15…25 | 100-C37D10 |
| | | | 30 | 100-C43D00 |
| | | | 40…50 | 100-C72D00 |
| | | | 60 | 100-C85D00 |
| | | | 75 | 100-D110ED11 |
| | | | 100 | 100-D140ED11 |
| | | | 125 | 100-D180ED11 |
| | | | 150 | 100-D180ED11 |
| | | | 200 | 100-D250ED11 |
| | | | 250 | 100-D300ED11 |
| | | | 300…350 | 100-D420ED11 |

| Description | Designation | Voltage | Hp | Part Number |
|---|---|---|---|---|
| Input Contactor | DIC | 208V AC | 3.0…7.5 | 100-C16D10 |
| | | | 10…15 | 100-C37D00 |
| | | | 20 | 100-C43D00 |
| | | | 25…30 | 100-C72D00 |
| | | | 40…50 | 100-D110ED11 |
| | | 460V AC | 3.0…20 | 100-C16D10 |
| | | | 25…30 | 100-C37D00 |
| | | | 40 | 100-C43D00 |
| | | | 50…60 | 100-C72D00 |
| | | | 75 | 100-C85D00 |
| | | | 100…125 | 100-D110ED11 |
| | | | 150 | 100-D140ED11 |
| | | | 200 | 100-D210ED11 |
| | | | 250 | 100-D300ED11 |
| | | | 300…350 | 100-D420ED11 |
| Output Contactor | DOC | 208V AC | 3.0…7.5 | 100-C16D10 |
| | | | 10 | 100-C23D10 |
| | | | 15 | 100-C37D00 |
| | | | 20 | 100-C43D00 |
| | | | 25…30 | 100-C72D00 |
| | | | 40…50 | 100-D110ED11 |
| | | 460V AC | 3.0…20 | 100-C16D10 |
| | | | 25…30 | 100-C37D00 |
| | | | 40 | 100-C43D00 |
| | | | 50…60 | 100-C72D00 |
| | | | 75 | 100-C85D00 |
| | | | 100…125 | 100-D110ED11 |
| | | | 150 | 100-D140ED11 |
| | | | 200 | 100-D210ED11 |
| | | | 250 | 100-D300ED11 |
| | | | 300…350 | 100-D420ED11 |
| Overload Relay | OL | 208V AC | 3.0 | 193-EEDB |
| | | | 5.0 | 193-EEEB |
| | | | 7.5…10 | 193-EEFD |
| | | | 15…25 | 193-EEGE |
| | | | 30…50 | 193-EEJF |
| | | 460V AC | 3.0 | 193-EECB |
| | | | 5.0…7.5 | 193-EEDB |
| | | | 10 | 193-EEEB |
| | | | 15…30 | 193-EEFD |
| | | | 40…60 | 193-EEGE |
| | | | 75…150 | 193-EEJF |
| | | | 200…350 | 193-EELG |
| Bypass Control Panel | CP1 | 208V AC | 3.0…50 | SK-C1-BCP1 |
| | | 460V AC | 3.0…100 | SK-C1-BCP1 |

| Description | Designation | Voltage | Hp | Part Number |
|---|---|---|---|---|
| Power Terminal Blocks | T1…T3 | 208V AC | 3.0…7.5 | 1492-W10 |
| | | | 10…20 | 1492-W16S |
| | | | 25…30 | 1492-W35 |
| | | | 40…50 | 67013(1) |
| | | 460V AC | 3.0…15 | 1492-W10 |
| | | | 20…30 | 1492-W16S |
| | | | 40…75 | 1492-W35 |
| | | | 100 | 67013(1) |
| | | | 125…150 | 67003(1) |
| | | | 200…300 | 69313(1) |
| | | | 350 | PDB-26-750-1(2) |
| Control Terminal Blocks | T31…T40 | 208V AC | 3.0…50 | 1492-W4 |
| | | 460V AC | 3.0…350 | 1492-W4 |
| **Style C Basic Bypass Packages** | | | | |
| Bypass Contactor | BC | 460V AC | 3.0…10 | 100-C16B10 |
| | | | 15…25 | 100-C37B00 |
| | | | 30 | 100-C43B00 |
| | | | 40…50 | 100-C72B00 |
| | | | 60 | 100-C85B00 |
| | | | 75 | 100-D110ED11 |
| | | | 100 | 100-D140ED11 |
| Input Contactor | DIC | 460V AC | 3.0…20 | 100-C16B10 |
| | | | 25…30 | 100-C37B00 |
| | | | 40 | 100-C43B00 |
| | | | 50…60 | 100-C72B00 |
| | | | 75 | 100-C85B00 |
| | | | 100 | 100-D110ED11 |
| Output Contactor | DOC | 460V AC | 3.0…20 | 100-C16B10 |
| | | | 25…30 | 100-C37B00 |
| | | | 40 | 100-C43B00 |
| | | | 50…60 | 100-C72B00 |
| | | | 75 | 100-C85B00 |
| | | | 100 | 100-D110ED11 |
| Overload Relay | OL | 460V AC | 60 | 193-EEGE |
| | | | 75…100 | 193-EEJF |
| Enable Relay | CR | 460V AC | 3.0…100 | 700-M200A24S |
| Power Terminal Blocks | T1…T3 | 460V AC | 3.0…15 | 1492-W10 |
| | | | 20…30 | 1492-W16S |
| | | | 40…75 | 1492-W35 |
| | | | 100 | 67013(1) |
| Control Terminal Blocks | T19…T24 | 460V AC | 3.0…100 | 1492-W4 |

(1) Manufactured by Gould-Shawmut.
(2) Manufactured by Ilsco.

## Enclosure Parts

| Description | Designation | Voltage | Hp | Part Number |
|---|---|---|---|---|
| **NEMA/UL Type 1 (Style B only)** | | | | |
| Control Transformer | T1 | 208V AC | 3.0…10 | TB-69300 (1) |
| | | | 15…30 | TB-69301 (1) |
| | | | 40…50 | TB-69302 (1) |
| | | 460V AC | 3.0…20 | TB-69300 (1) |
| | | | 25…60 | TB-69301 (1) |
| | | | 75…300 | TB-69302 (1) |
| | | | 350 | TB-81215 (1) |
| Control Transformer Fuses | FU4…FU5 | 208V AC | 3.0…10 | ATQR-1 (2) |
| | | | 15…30 | ATQR-2 (2) |
| | | | 40…50 | ATQR-3 (2) |
| | | 480V AC | 3.0…60 | ATQR-1 (2) |
| | | | 75…300 | ATQR-2 (2) |
| | | | 350 | ATQR-3.5 (2) |
| **NEMA/UL Type 12** | | | | |
| Control Transformer | T1 | 208V AC | 3.0…10 | TA-2-69301 (1) |
| | | | 15…20 | TB-69302 (1) |
| | | | 25…50 | TA-2-69302 (1) |
| | | 460V AC | 3.0…15 | TA-2-69301 (1) |
| | | | 20 | TA-2-69302 (1) |
| | | | 25…60 | TB-69302 (1) |
| | | | 75…125 | TA-2-69303 (1) |
| | | | 150 | TA-2-69305 (1) |
| Control Transformer Fuse Holder | | 208V AC | 3.0…50 | PL-112701 (1) |
| | | 460V AC | 3.0…60 | PL-112701 (1) |
| | | | 75…125 | PL-112702 (1) |
| | | | 150 | PL-112704 (1) |
| Fan & Filter | | 208V AC | 3.0…10 | PF42500 (3) |
| | | | 15…20 | PF43000 (3) |
| | | | 25…50 | PF65000 (3) |
| | | 460V AC | 3.0…15 | PF42500 (3) |
| | | | 20…40 | PF43000 (3) |
| | | | 50, 60 & 125 | PF65000 (3) |
| | | | 75 | PF66000 (3) |
| | | | 100 & 150 | PF67000 (3) |
| Exhaust Filter w/Grille | | 208V AC | 3.0…20 | PFA4000 (3) |
| | | | 25…50 | PFA6000 (3) |
| | | 460V AC | 3.0…40 | PFA4000 (3) |
| | | | 50…150 | PFA6000 (3) |
| Filter Media | | 208V AC | 3.0…20 | 18611600036 (3) |
| | | | 25…50 | 18611600037 (3) |
| | | 460V AC | 3.0…40 | 18611600036 (3) |
| | | | 50…150 | 18611600037 (3) |

| Description | Designation | Voltage | Hp | Part Number |
|---|---|---|---|---|
| **NEMA/UL Type 3R** | | | | |
| Control Transformer | T1 | 208V AC | 3.0…10 | TB-69302 (1) |
| | | | 15…30 | TA-2-69302 (1) |
| | | | 45…50 | TA-2-69303 (1) |
| | | 460V AC | 3.0…5.0 | TA-2-69302 (1) |
| | | | 7.5…20 | TB-69302 (1) |
| | | | 25…40 | TA-2-69302 (1) |
| | | | 50…100 | TA-2-69303 (1) |
| | | | 125…150 | TB-69303 (1) |
| Control Transformer Fuse Holder | | 208V AC | 3.0…30 | PL-112701 (1) |
| | | | 40…50 | PL-112702 (1) |
| | | 460V AC | 3.0…40 | PL-112701 (1) |
| | | | 50…150 | PL-112702 (1) |
| Fan & Filter | | 208V AC | 3.0…10 | SCE-FA44 (4) |
| | | | 15…30 | SCE-FA66 (4) |
| | | | 40…50 | SCE-FA1010 (4) |
| | | 460V AC | 3.0…5.0 | No Fan |
| | | | 7.5…20 | SCE-FA44 (4) |
| | | | 25…40 | SCE-FA66 (4) |
| | | | 50…150 | SCE-FA1010 (4) |
| Exhaust Filter w/Grille | | 208V AC | 3.0…10 | SCE-FGA44 (4) |
| | | | 15…30 | SCE-FGA66 (4) |
| | | | 40…50 | SCE-FGA1010 (4) |
| | | 460V AC | 3.0…5.0 | No Filter |
| | | | 7.5…20 | SCE-FGA44 (4) |
| | | | 25…40 | SCE-FGA66 (4) |
| | | | 50…150 | SCE-FGA1010 (4) |
| Filter Media | | 208V AC | 3.0…10 | SCE-RF44 (4) |
| | | | 15…20 | SCE-RF66 (4) |
| | | | 25…50 | SCE-RF1010 (4) |
| | | 460V AC | 3.0…5.0 | No Filter |
| | | | 7.5…20 | SCE-RF44 (4) |
| | | | 25…40 | SCE-RF66 (4) |
| | | | 50…150 | SCE-RF1010 (4) |
| Heater | | 208V AC | 3.0…20 | D-AH1001A (5) |
| | | | 25…50 | D-AH2001A (5) |
| | | 460V AC | 3.0…40 | D-AH1001A (5) |
| | | | 50…150 | D-AH2001A (5) |
| **NEMA/UL Type 4** | | | | |
| Control Transformer | T1 | 208V AC | 3.0…20 | TA-2-54525 (1) |
| | | | 25…30 | TA-2-81202 (1) |
| | | | 40…50 | TA-2-81203 (1) |
| | | 460V AC | 3.0…5.0 | TA-2-69302 (1) |
| | | | 7.5…40 | TA-2-54525 (1) |
| | | | 50…60 | TA-2-81202 (1) |
| | | | 75…100 | TA-2-81203 (1) |
| | | | 125…150 | TA-2-69303 (1) |

| Description | Designation | Voltage | Hp | Part Number |
|---|---|---|---|---|
| Control Transformer Fuse Holder | | 208V AC | 3.0…30 | PL-112706(1) |
| | | | 40…50 | PL-112707(1) |
| | | 460V AC | 3.0…5.0 | PL-112701(1) |
| | | | 7.5…60 | PL-112706(1) |
| | | | 75…100 | PL-112707(1) |
| | | | 125…150 | PL-112702(1) |
| Air Conditioner | | 208V AC | 3.0 | No Air Conditioner |
| | | | 5.0…10 | IQ1800VS-126(6) |
| | | | 15…20 | IQ3000VS-126(6) |
| | | | 25…30 | IQ5000V16-126(6) |
| | | | 40…50 | IQ8000V16-126(6) |
| | | 460V AC | 3.0…5.0 | No Air Conditioner |
| | | | 7.5…20 | IQ1800VS-126(6) |
| | | | 25…40 | IQ3000VS-126(6) |
| | | | 50…60 | IQ5000V16-126(6) |
| | | | 75…100 | IQ8000V16-126(6) |
| | | | 125…150 | DTS 3361(3) |
| Filter Media | | 208V AC | 3.0 | No Filter |
| | | | 5.0…50 | Media is washable |
| | | 460V AC | 3.0…5.0 | No Filter |
| | | | 7.5…20 | Media is washable |
| | | | 25 | POF1019-GAL(6) |
| | | | 30…100 | Media is washable |
| | | | 125…150 | 18881500002(3) |
| Heater | | 208V AC | 3.0…30 | D-AH1001A(5) |
| | | | 40…50 | D-AH2001A(5) |
| | | 460V AC | 3.0…60 | D-AH1001A(5) |
| | | | 75…150 | D-AH2001A(5) |

(1) Manufactured by Acme Electric.
(2) Manufactured by Gould-Shawmut.
(3) Manufactured by Pfannenberg Inc.
(4) Manufactured by Saginaw Control & Engineering
(5) Manufactured by Hoffman Enclosures Inc.
(6) Manufactured by Ice Qube Inc.

## Notes:

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